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Oxford. University of Magdalen College.

The Daubeny Laboratory Register

1849–1923

Complete in one volume

By R. T. Gunther, M.A., Hon. Ll.D.

Curator of the Lewis Evans Collection
Research Fellow and formerly Tutor in Natural Science at
Magdalen College

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CHARLES GILES BRIDLE DAUBENY

This Plate has been prepared from the Painting in the Library of the Physic Garden and is presented by R. Günther in memory of his illustrious predecessor and benefactor at the Laboratory

A History of
The Daubeny Laboratory
Magdalen College
Oxford

To which is appended a list of the Writings of Dr. Daubeny, and a Register of the Names of Persons who have attended the Chemical Lectures of Dr. Daubeny from 1822 to 1867 as well as of those who have received instruction in the Laboratory up to the present time

By R. T. Günther, M.A., F.L.S.
Fellow and Tutor of Magdalen College

With a Preface by the President of Magdalen

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PREFACE

My friend and colleague, Mr. Günther, has asked me to write a few words by way of Preface to this volume. I am not sure that any words at all are needed. If any are they should certainly be few. There are of course some still living in the University and in the country, who even yet remember Dr. Daubeny at work in his Lecture Room and in the Laboratory which bears his name, but they are a small and rapidly diminishing band. While, however, his personal memory must more and more fade from among us, and by-and-by disappear altogether, it may fairly be claimed for him, as for many greater and even more than for some greater men, that the result of his effort is still growing and becomes more and more apparent.

Daubeny was without doubt a pioneer, and a pioneer of a great army advancing in a noble cause. The study of Natural Science in Oxford in the first half of the last century lay for the most part, like the Botanic Garden itself, outside the wall and circle of the Academic republic, and its professors were liable to be regarded as eccentric in more senses than one. About Daubeny's own personality, moreover, there would seem to have been always a little, or more than a little, to smile at, and stories are still remembered of his amiable foibles and the humorous aspect of his lectures and experiments, which were not always apparently taken as seriously as they were meant to be. But he had the advantage of being a Winchester and Oxford man, trained in the old humanities, a scholar and a gentleman, uniting simple piety with liberal views, and, like Acland a little later, he was able to conciliate opposition and gradually to introduce

Natural Science into his College and University in a way which might have been difficult for a more forceful but less acceptable advocate. Not that Daubeny was a weak or superficial person; on the contrary, he was a man of sound sense and genuine attainment, and if he held, in those days of pluralism, three Professorships, he did good work in the subjects of each and all.

His books on *Volcanos*, on *Roman Husbandry*, on *The Influence of the lower Vegetable Organisms in the Production of Epidemic Disease*, his early welcome to Darwinism in his tractate on *The Sexuality of Plants*—these and many other of his writings have long since been duly appreciated. As a writer and observer, he has received then probably adequate recognition. But to his efforts as a teacher, and to the value of the institutions and collections which he left as his legacy to subsequent generations, less justice has been done. To repair that omission is the purpose of the present volume.

The long list of those who attended Daubeny's lectures, first at the Ashmolean Laboratory and afterwards at the Botanic Garden [1], will come as a revelation to many both in Oxford and outside, in regard alike to the number and the distinction of the names which it contains.

That this frequentation was entirely prompted by enthusiasm, or was altogether spontaneous, must not be asserted. But the genuine popularity of these lectures is still vouched for by living witnesses. And even a 'soft option' may also be an interesting option, and an agreeable course may also be an instructive course. Mr. Günther has indicated a few of the most distinguished auditors, but old Oxford men will note in addition names such as those of Bishop Hobhouse, 'Charlie' Neate and Mr. Edward Poste, of Oriel, Father Benson, Sir Edmund Monson, and Mr. E. H. Pember, K.C.

The subsequent history of the Laboratory which Daubeny founded and to some extent endowed, continues to be interesting after its originator had passed away. It has at times

[1] Appendix E.

somewhat anticipated the University teaching. It has afforded a home and opportunity for many stray Professors and students, and been the scene of not a little excellent original research.

The first function it fulfilled when Yule and Lawson arranged their courses of lectures on Biology in conjunction with those of Ray Lankester.

As to the second it is sufficient to mention among the names of men of mark who have worked within its precincts those of H. G. Madan, Wyndham, Yule, Pike, Jeffrey Bell, Burdon-Sanderson, Gotch, Lazarus Fletcher, Harold Dixon, and Veley. Popular lectures to artisans have also been given within its walls; and it has frequently been of much assistance to the College School.

But its normal employment has been to act as a College Laboratory. Such was its main work under the long and happy rule of Mr. Edward Chapman[1], such it is still under his pupil, Mr. R. T. Günther, the author of this volume, with his Assistant Lecturer, Mr. Nevil Sidgwick, Fellow of Lincoln College, and the present Daubeny Curator, successor to old 'John Harris,' Mr. J. J. Manley, on whom the University only the other day conferred the well-deserved distinction of an honorary M.A.

If evidence is required of its further usefulness it will be found in the Meteorological Records and list of Researches contained in the Appendices A and B to this volume.

The College Praelectorship of Natural Science, instituted by Waynflete as part of his original foundation, one of the earliest endowments of the kind for Natural Science in the University, and indeed in the country, for it was older than any of the Oxford Professorships, had been held by useful and distinguished men before Daubeny. But it may fairly be said that Daubeny notably extended its usefulness. It is now merged in the Waynflete Professorship of Chemistry.

The College, which in 1847 made a substantial contribution to the sum to be laid out by Daubeny, has just enlarged and reconstructed the building then erected. It is to be

[1] Fellow and Tutor, now M.P. for the Hyde Division of Cheshire.

hoped that the results to be achieved in it may be in proportion. But in the meantime the beginning of a new order seemed a fitting moment for gathering up the story of the work done in the smaller building. Of the history of Natural Science in the University this story forms only a chapter, and to that of Natural Science generally it is, to use R. L. Stevenson's happy expression, 'but a footnote.'

Yet as such it appeared to the College worth putting on record and giving to the world. If that opinion was correct, and if it should find any acceptance and prove of any use, our thanks are due, and we trust those of the reader will be added, to Mr. Günther for the diligent and complete manner in which this record has been compiled, and to Mr. Günther and Mr. Chapman for the plates which give an additional interest to the volume.

T. HERBERT WARREN.

MAGDALEN COLLEGE, OXFORD,
January, 1904.

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The first plate is presented by the Author.
The second and third plates are presented by Mr. Edward Chapman, M.P.

HISTORY OF THE DAUBENY LABORATORY AT MAGDALEN COLLEGE

History of the Site.

THE land upon which the Daubeny Laboratory Buildings stand was originally part of the low-lying water-meadow, afterwards named Parys Mede, which lay to the east of the city, and was not built upon because it was frequently flooded by the Cherwell. The level of this part of the meadows had, however, been artificially raised upon more than one occasion, for in digging trenches for the foundations of the new building of 1902, some six or seven feet of made ground containing abundant potsherds, were dug out before the firm, untouched subsoil was reached.

Our forefathers of the Middle Ages allowed the Jews to use this waste land for a burial-ground, as we learn from the earliest records we have of this spot, dating from the twelfth century[1], which were confirmed in the seventeenth by Lord Danby, whose experience is recorded by Wood: 'Sufficient testimonies of which area or coemitery of the Jews . . . were the number of men's bones that were found and dug up at the foundation of the Physick Garden wall[2]'; and more recently Dr. Daubeny himself, when the foundations of the Laboratory Building were dug, came upon a great number of human bones. Dr. Daubeny's assistant, John Harris, witnessed their reinterment under the evergreen oak, near the Bridge, in a sawpit which had been used by the builders, and later on a full-length skeleton was exhumed near the Herbarium by Mr. E. Chapman, when a trench was dug for the purpose of curing the dampness of the walls.

[1] 'In 1177 the Jews of Oxford had a cemetery without the East Gate, where the Tower and South Side of Magdalen College now stand; afterwards this was transferred to the opposite side of the road, in the present Botanical Garden, where a mass of human bones was dug up in 1642.'—Boase, *Oxford*, p. 24.

[2] Wood, MS. fol. 228 b. Cf. Chandler's *Life of Waynflete*, p. 89, note.

The history of the ground can be continued in Wood's words: 'After their [the Jews] expulsion from this nation it [the cemetery] came to St. John Baptist's Hospitall adjoyning, who imployed it as a churchyard to bury their dead. But that Hospitall being dissolved and turned into Magdalen College, ceased from that use and was imployed as a plot of greensoard or meadow ground by a tenant of that college their [=there] living.'

The land which thus came into the possession of St. John's Hospital was probably only the lower portion of Parys Mede[1] which lay next the Cherwell and was bounded on the west by 'the way leading from East Bridge to the feild behind Merton College'; this way was presently to be known as Trinity Lane, and is the present Rose Lane. Wood's further statement that the Hospital owned and sold property nearer the East Gate, he contradicts elsewhere by asserting that the property was purchased from St. Frideswyde.

During the fourteenth century the frontage of Parys Mede was divided into tenements with buildings very like those shown in the earliest plans of the city (Agas, 1578). On the west side of the lane the Trinitarian Friars had acquired a chapel and house at St. Frideswyde's Gate[2], and from them the lane took the name of Trinity Lane; and it would appear from the position of the inscription 'sometime Trinitie Hall' in Agas's map, that either the prior and brethren of the Order 'being minded to enlarge their territories,' or their successors, the principal and scholars of Trinity Hall, had a lease of tenements on the east side of Trinity Lane. If any one of these buildings were attached to Trinity Hall, it is likely to have been the two-story house (marked in Hollar's map, 1643) which was shown standing in 1675 in Loggan's map, very near the north-western angle of the

[1] 'Note that all the south side of this street [East Bridge Street] was a meed anciently called "Parys."'—Marginal note to Wood.

[2] Also called Teckew Gate. The tradition of the ancient gate might seem to be preserved in the name, Magdalen *Gate* House, which stands on the site of the chapel of the Trinitarians, were it not that this name is of recent origin, having been given during the tenancy of Mr. E. Chapman. The site was acquired by Perrot, 1546, who pulled down the chapel and house and built a 'barn, stable, and pigstie.'

lawn between the High Street and Rose Lane. Besides this house, two small cottages opposite the present Magdalen Lodge and two others in Rose Lane remained in existence for several years after the formation of the Physic Garden in 1622–33.

The Physic Garden.

The next chapter in the history of the site of our Laboratory is concerned with that of the Physic Garden, which is by far the most ancient establishment connected with Natural History in Oxford, for the collections of Tradescant and of Ashmole did not become the property of the University until 1683, twenty-one years after the foundation of the Royal Society.

For the history of the origin of the Garden we may again refer to Wood, who tells us how 'Henry, Lord Danvers, Baron of Dauntsey in the county of Wilts. and Earl of Danby, giving to the University the sum of £250 in money to purchase a piece of ground for a nursery of phisicall simples for the University, bought the said mede containing about 5 acres of ground of the present tenant thereof and presently after of the College it selfe A.D. 1621, to be held of them by lease. Afterwards much soil being conveyed thither for the raising of the ground, the day for the laying the first stone therof was designed. Which being come, viz. S. Jeamses Day [25 July] 1622, the Vicecancellor, Dr. Peirce, about 2 of the clock in the afternoone togeather with the proctors and most of the doctors of the University solemnized it with great ceremony. For in the first place Mr. . . . Dawson, a phisitian of Broadgates, speak there an elegant oration; then Dr. Clayton, the King's Professor of Phisick, another; and last of all the Vicecancellor; with the offering severall sums of money according to the antient fashion.

'Afterwards the said earl proceeded in building of it and enclosing it with a very faire wall of freestone, and in the front therof next to East Bridge Street a comly gatehouse.' ['The wall about it was finist, 1633, ut in Gest. canc. Laud, p. 65.'—Marginal note.]

The wall with which the College permitted Lord Danby to

enclose the Garden, about twelve feet high and two feet thick, was found to be sufficiently strong to serve as the lower part of the south wall of the new Laboratory of 1902. The original drip moulding has been retained in the ground-floor room.

House of Professor of Botany.

In the original plan for the Garden the Gardener or Professor was expressly enjoined to reside at the Garden, and to enable him to do so conveniently an official residence was built near the end of the south side of the old East Bridge: it is marked in Hollar's map of the Garden (1643). In the Oxford Almanack for 1772, which gives us a view of the old East Bridge Street at that point, the street front of the house is shown, and the same view represents the sign of the Noah's Ark Inn which stood, together with 'certaine poore cottages and scattering houses[1],' along the strip of land in front of the Laboratory facing the College.

The New Bridge.

The erection of a new bridge over the Cherwell commenced in 1772 resulted in various alterations on the south side of the street. To improve the approach to the bridge by raising the roadway, it was found necessary to demolish the house belonging to the Professor of Botany (1795), and the site of the house, like the terrace in front of Balliol College in the Broad, was surrendered to the Commissioners of the Paving Act, to enable them to improve the street, and to pile the stones necessary for its repair.

By this widening the plot north of the Garden wall was reduced in width by the amount it had previously projected in front of the site of Trinity Hall or of the Magdalen Gate House; a projection which is indicated in Loggan's map. No doubt the existing lime-trees were planted soon after.

The then occupant of the Botanical Chair, Professor Sibthorp, finding no other shelter suitable for the Sherardian Collection of Botanical Books and Herbarium, which had till then been kept in the official residence, caused the eastern greenhouse to be converted into a Library and Lecture Room.

Dr. Daubeny, Professor of Botany.

Such was the condition of things in 1834, when Dr. Daubeny, M.D. and Fellow of Magdalen College, who had been Pro-

[1] Leonard Hutten.

fessor of Chemistry since 1822, was chosen to succeed Sibthorp as Sherardian Professor of Botany. With characteristic energy he immediately applied himself to bring the Garden into a state of efficiency better suited to the progress the science had made; and, even before delivering his inaugural lecture, he had presented a report to the Visitors of the Garden, and had set on foot a subscription to enable the University to bring the proposed reforms into effect.

The improvements at first contemplated by Professor Daubeny did not involve any serious alterations on the north side of the wall of the Garden. The western greenhouse, which had no glass roof, and was very indifferently supplied with light from windows in the southern front, having been erected about a century previously when the constructing of greenhouses was but ill understood, was to be transformed into a Lecture Room, new glasshouses were to be erected, and it was to be explained to the Street Commissioners that their room was of greater value than their company or rather than that of their heaps of stones; and by the eviction of these it became possible to erect at the back of the Library (once a greenhouse), a new residence[1] for the Professor of Botany, which was used as such from about 1836 until the death of Dr. Daubeny in 1867, when it was devoted exclusively to the Herbarium.

Professor of Chemistry. Early works and lectures.

During the twelve years, 1822–34, which had elapsed between the election of Dr. Daubeny to succeed Dr. Kidd in the Aldrichian Chair of Chemistry and to the Sherardian Professorship, he had produced the books by which he is best known—his treatise on *Volcanos* (1826), and the *Introduction to the Atomic Theory* (1831), as well as several original memoirs published in *Jameson's Edinburgh Philosophical Journal* and in the *Philosophical Transactions*. He had filled the office of Bursar and of Vice-President of Magdalen College. We still possess a record of attendances at his Professorial lectures, which were delivered at the

[1] The fundamental error in the construction of this building as a dwelling-house was that all the living-rooms were made to face the north. 'Dove non entra il sole entra il medico.'

Laboratory under the Ashmolean Museum, dating from the winter of 1822, when he started with thirty-two pupils, who increased to forty-one in the next year[1]. (See Appendix E.)

Among the signatures of those who attended these early lectures on Chemistry, we find the names of E. B. Pusey and Mark Pattison, of Tait, Whately, and Thomson, the future archbishops of Canterbury, Dublin, and York, of Sir John Bennett Lawes, the originator of the Rothamsted Agricultural Experiments, and of Sir Edmund Head, who became Governor-General of Canada. In 1836 we read that Henry Acland, not content with a single course, paid a three-guinea fee for an 'unlimited attendance' at the lectures on Chemistry: it is not to be wondered that he became Regius Professor of Medicine and Sir Henry Acland, Bart. In the 1837 list we find the signature of John Ruskin; and in others the names of H. G. Liddell, R. W. Church, Nevil Story, afterwards Maskelyne, Frank Buckland, H. J. Coleridge, Sir Frederick Gore Ouseley, and many others which will be found in the Appendix.

Dr. Daubeny, no doubt fearing that his acceptance of a second Professorship might lead the ill-informed to pass an unfavourable criticism on pluralists, made use of the opportunity afforded by his inaugural lecture to point out how slender was the emolument derived from either post, and to show that many inquiries of a chemical nature can scarcely be prosecuted without the assistance of a Botanical Garden, and that, on the other hand, some of the most important problems in vegetable physiology require for their elucidation the aid of chemical science.

[1] It is interesting to compare these numbers with those of the attendances at scientific lectures during a previous epoch. By referring to a tract by Edward Tatham, Rector of Lincoln, entitled, *A New Address to the Free and Independent Members of Convocation* (Oxford, 1810), the curious reader may find that the average attendance at the public lectures in Natural and Experimental Philosophy during fourteen terms in the years 1773–7 was close upon fifty, whereas in 1809 the attendance at similar lectures had dropped to fourteen in the Lent term and to so small a number in the Easter and Michaelmas terms that no class was held. The Rector attributes the falling off in the attendance at these lectures, as well as at the public lecture on Chemistry, to the operation of the new statute respecting Public Examination which had just been passed.

That his new duties at the Botanical Garden did not lead to the neglect of his chemical teaching or studies is proved by his frequent revision of his lectures, of which the manuscripts are preserved in the College Library, and by the appearance of a *Supplement to an Introduction to the Atomic Theory* (1840). Although much time and thought must have been spent upon the buildings and improvements to the Garden already mentioned, yet before two years had passed he had completed a very important research on the Action of Light upon Plants and of Plants upon the Atmosphere; and thus he anticipated Draper by some eight years in demonstrating that the light belonging to the red end of the spectrum is most effectual in promoting the evolution of oxygen by plants. Some of the glass vessels still bear stains of the port wine which was used as a red screen.

The geological results of his Italian and American journeys in 1834 and 1837–8 were first given to the Ashmolean Society, and many specimens of volcanic rocks were added to his collections.

Professor of Rural Economy.

In 1840 the high regard in which his many qualifications were held found expression in his election to a third Professorship—that of Rural Economy—which he held until his death.

During the seven years following, his researches were mainly directed to the scientific aspects of certain branches of Agriculture, and the results were published in several papers in the *Journal of the Royal Agricultural Society*: his three lectures on Agriculture were even translated for the benefit of Italian farmers. Chief among these chemical agricultural labours were investigations *On the Chemical Constituents of Crops*, *On the Scientific Principles by which the Application of Manures ought to be regulated*, *On the Use of Spanish Phosphorite, as a Manure*. The *Memoir on the Rotation of Crops, and on the Quantity of Inorganic Matter abstracted from the Soil by Various Plants under Different Circumstances*, was first delivered in 1845 as the Bakerian Lecture to the Royal Society.

In his agricultural researches, Dr. Daubeny was no doubt

much influenced by the work and genius of his great friend Liebig[1], who had won his Professorship at Giessen in 1824, soon after Dr. Daubeny's election to the Aldrichian Professorship, and who published his great work on Agricultural Chemistry in the very year of Dr. Daubeny's appointment to the Rural Economy Chair. In 1842 Liebig made a sort of triumphal tour among the agriculturalists of this country, expounding his views on the need of chemical knowledge. Lord Playfair[2] has stated that one of the immediate effects of Liebig's campaign was to induce colleges to open laboratories for teaching chemistry. Chief among these were the laboratory of the School of Mines in Jermyn Street and the laboratories of University College and of King's College, London. A great wave of laboratory building swept across this country. In 1845 the Royal College of Chemistry, now merged in the Royal School of Science, South Kensington, was founded, and it is very likely that the first inception of the Daubeny Laboratory is to be attributed, at any rate in part, to Liebig's visit to this country a few years before.

Liebig's tour.

Dr. Daubeny had hitherto delivered his professorial lectures on Chemistry in the basement of the Ashmolean Building, in a subterranean room which was quite unfit for the purpose. In fact, he had on more than one occasion felt it his duty 'to press upon the University the importance of providing, as soon as possible, a suitable laboratory for the practical instruction of students.' He described the old Lecture Room as 'notoriously unworthy of a great University, being dark, inconvenient and confined[3].'

Ashmolean Lecture Room unsatisfactory.

Closely bound up with chemical operations as most of his

[1] The miniature porcelain bust of Liebig in the Laboratory was presented to Dr. Daubeny by the great German chemist himself.

[2] Hofmann Memorial Lecture. *Journal of the Chemical Society*, 1896, p. 577.

[3] My friend Mr. Webb has drawn my attention to a passage in Henry Kingsley's *Ravenshoe*, which is strongly reminiscent of the defective ventilation of the old Ashmolean Lecture Room: 'He lay here one day when the doctors came down from London. And one of them put a handkerchief over his face which smelt like chemical experiments and somehow reminded him of Dr. Daubeny.'—Ch. lxii.

researches, whether on agricultural or vulcanological subjects or on mineral waters, were, it was but natural that he should also feel the loss of time consumed in going backwards and forwards between his house at the Physic Garden, where his duties chiefly lay, and his gloomy Lecture Room beneath the Ashmolean Museum. He determined, therefore, to erect a Lecture Room and Laboratory close to the Garden, and the work was actually commenced in 1848, the year after he had held the office of Bursar at Magdalen College.

A new Lecture Room required.

No doubt his large and ever increasing collections of minerals, rock specimens, books, and physical instruments, as well as his enlightened ideas of the needs of the efficient teaching of science at Magdalen College, of which he had had sole charge as Praelector since 1820, determined the main lines on which the building was planned.

The conditions on which Dr. Daubeny was permitted by Magdalen College to build are stated in the College Order for November 12, 1847:

Daubeny's Application to the College in 1847.

'Dr. Daubeny having requested permission to build a Lecture Room on the ground adjoining the Physic Garden, the spot on which it is placed to be at any time resumable by the College, it is agreed to grant him leave to build the Lecture Room on the proposed spot near the principal gate of the Garden at the distance of at least three feet from the wall. It is further agreed to allow Dr. Daubeny, his heirs or assigns, the sum of £282, being a moiety of the sum proposed to be laid out by Dr. Daubeny in case the Society shall at any time hereafter within the period of twenty years find occasion or think it proper, after six months' notice, to resume the whole of the ground into their own hands, but after that time the College shall have the option of assuming it without any payment.'

Daubeny died December 12, 1867—just over twenty years from the date of this order, but not quite twenty years from the date of the erection of the building, of which he speaks in his will as 'the new buildings erected by me in the year 1848, opposite to Magdalen College, on ground belonging to the said College.'

Description of Building.

The building was erected on the north side of the central west greenhouse of the Physic Garden. It was more than a mere lecture room, being a rectangular brick building of two stories; it was covered with stucco in a plain classical style. That it was not originally contemplated to carry the building much higher than the greenhouse on the south side of the wall seems to be indicated by the fine cornice round the lower part of the building. The upper story of four rooms must, however, have been added soon after, as a domicile for the Curator of the Building, and Dr. J. F. Payne, now Physician at St. Thomas's Hospital, has informed me that he occupied these rooms during his year as Probationer Fellow, and took pupils[1] there. I can well remember a red bedroom paper on the walls of one of the rooms.

On the ground floor a central doorway (now a window) opened into the Lecture Room, measuring forty-one feet long, by twenty feet broad, by sixteen feet high, which was surrounded by a gallery for cupboards for Physical and Chemical apparatus (Plate 2). A large doorway in the middle of the south side led to the Botanical Lecture Room, and at the east end was Dr. Daubeny's private study, containing the Geological Collections both Palaeontological and Volcanic (Plate 3). The upper part of this room was also surrounded by cupboards and drawers in which the Collections of Chemical and Mineralogical Specimens were preserved, and it was divided from the lower part by a floor.

In the Lecture Room cupboards were carried round the whole wall space, and even across the upper parts of the windows, thus materially contributing to the gloom of the interior[2].

In accordance with the College Order, the main fabric stood four feet away from the Garden wall. The reason for this detail is not easy to imagine, unless it be that among the Fellows some harboured a design for the eventual demolition

[1] One of Dr. Payne's pupils was Mr. Edward Chapman, who, as he has himself informed me, read physiological chemistry with Dr. Payne in preparation for his final schools in 1863.

[2] That this was part of the original design would seem to be indicated by the fact that, before the alterations made in 1902, the upper window-sashes had never been provided with sash-lines and weights.

THE LECTURE-ROOM AT THE DAUBENY LABORATORY

From a water-colour drawing (c. 1870) in the possession of Mr. Edward Chapman, M.P. by whom this plate is presented

of the building, while others considered that fumes might penetrate the wall and damage the plants in the greenhouse on the south side. Whatever the reason, certain it is that the space between the outer wall of the Laboratory and the wall of the Physic Garden was eventually covered with a glass roof, and made to enclose three staircases, five flights of stairs in all, which placed the upper rooms in communication with the ground floor.

Two of the staircases were probably introduced at about the time (1853) when, the greenhouse[1] at the back of the Laboratory having become a Lecture Room for the Professor of Botany, a Botanical Museum[2] was built over it, with part of the funds collected for the improvement of the Physic Garden by Daubeny.

Telescope building.

A fine equatorially mounted telescope of five-inch aperture by Cooke was presented to the College in March, 1855, for which a new stand was ordered in the following June ; and in December, 1856, it was ordered that a building for the new telescope should be erected 'contiguous to the wall of the Botanic Garden according to the plan of Mr. Buckler, at an estimate of £185.'

Workshop and Meteorological Apparatus Room.

The space between the Telescope vault and the west wall of the Laboratory was occupied by a workshop of rather flimsy structure and an Observer's Room, whence a staircase gave access to the telescope above, and in which were afterwards placed all the instruments connected with meteorology. Both workshop and Apparatus Room were pulled down when the new building of 1902 was erected. Outside the window of the latter room stood a large aquarium, a gift to the College, which for ten years was tenanted by some golden tench which had been presented by the Duke of Bedford in 1875.

Resignation of Chair of Chemistry.

The building had hardly been finished six years when Daubeny resigned the Chair of Chemistry to a younger man, Mr. (afterwards Sir Benjamin) Brodie, in order that he might

[1] Built in the eighteenth century.

[2] The original access to the upper room was by the central of the said three staircases on the north side of the wall. The doorways in the party wall were bricked up in Professor Lawson's time.

devote his time and strength more particularly to his duties in connexion with the Chairs of Botany and of Rural Economy, which he held conjointly until death. Consequently the Laboratory was only ready for use at a time when its founder had already lived those years of his life which were the most productive of scientific research. His published investigations on Volcanos, on Mineral Waters, on the Atomic Theory, and on various problems of Vegetable Physiology had long had a great and well-deserved reputation in the scientific world. It was therefore hardly to be expected that from the new Laboratory should issue the results of investigations equal in importance to those which marked the most fertile period of his scientific activity. During this period, however, it had been the principal Chemical Laboratory in the University[1].

Like many other leaders of science Daubeny found the later years of his life more and more occupied with affairs of administration and busied with literary rather than with experimental work. And, stirred by the religious controversies of the times (1860), he too contributed his share to theological literature.

Lectures. As soon as the new Laboratory at Magdalen was ready for occupation he appears to have ceased lecturing in the vaults of the Ashmolean[2], which seems to have been in 1849, when the names of the Choristers, of Frederick Bulley, then a Fellow of the College, and of many Magdalen men, appear in the Lecture Lists, and the Professor published a *Syllabus of a course of Lectures on the Principles of Inorganic Chemistry.*

Although the continually increasing burden of new and expanding duties had compelled Daubeny to resign the Professorship of Chemistry in the University in 1854, yet he was so deeply impressed with the advantages to be derived

[1] The Christ Church Building, left vacant by the transfer of the Lee's anatomical collection and of Dr. Acland's osteological and pathological collections to the University Museum, was not equipped as a chemical laboratory and lecture room until 1866. Some physical apparatus of an elementary kind was added soon after the appiontment of a third Lee's readership in 1869. The Balliol Laboratory was not opened before 1879.

[2] Cp. Note to the *Address to Members of the University*, published as an Appendix to the *Guide to the Botanic Garden*, p. 13.

from this science that in 1855 he delivered an address to the Royal Institution *On the Importance of the Study of Chemistry as a Branch of Education for all Classes.* And he put his theory into practice by personally instructing, as the College Praelector of Natural Philosophy[1], the undergraduates of Magdalen College in Chemistry until his death, in a series of annual courses of 'Catechetical Lectures,' commenced on October 28, 1855[2].

The average attendance was generally about ten; and to judge by an interleaved copy of Fownes's *Treatise of Chemistry* in the Laboratory, the lectures were largely based upon that manual. During the winter months, when impaired health compelled him to live away from Oxford in the warmer climate of Torquay, the course was continued by Mr. T. H. T. Hopkins, Fellow of Magdalen College, during the winters of 1858 and 1860; by Mr. H. G. Madan, Fellow of Queen's College, in 1865; and by Mr. A. G. Girdlestone, Demy of Magdalen, during Lent, 1867. The last lecture given by Daubeny seems to have been on October 24, 1867. During his last illness Mr. Girdlestone again carried on the work of teaching from October 31 to December 12, 1867.

Daubeny's later Researches.

The chemical researches which were carried out by Dr. Daubeny in the Magdalen Laboratory were chiefly of an analytical nature, and related to the agricultural problems upon which he was engaged. He experimented upon samples of Barley grown in soils containing varying amounts of potash and soda; he examined the effect of Rocks of various geological ages upon the produce of barley sown in them; and the power of the Roots of plants in rejecting poisonous or abnormal substances presented to them; and a few months before his death he published a paper on Ozone and on its disengagement by the leaves of plants. A list *in extenso* of his published researches will be found in Appendix D.

[1] Under the original statutes of Magdalen College the Praelector might lecture either in divinity or natural philosophy at the discretion of the College officers.

[2] The MS. of one of the first of his College lectures, delivered in 1820, is still preserved in the Library, together with a pile of oft-revised MSS. of later date.

Much of the apparatus used by him in these and also in his earlier researches is preserved; and so we possess a larger collection of chemical glass, &c., of the first half of the nineteenth century than is commonly to be found in modern laboratories, as well as a collection of instruments of considerable value from the point of view of the development of chemical apparatus and manipulation. The extreme thickness of the glass eudiometers and the magnitude of the gas-holders define a well-marked period in the history of pneumatic chemistry which followed the period of Cavendish and Black. And it is wonderful what accurate results this clumsy apparatus could be made to yield in skilful hands.

Of particular interest are the variously tinted shades of coloured glass employed in his classical research on the Action of Light upon Plants and of Plants upon Atmosphere, and which are therefore available either for repeating the experiments or for a more searching spectroscopic examination of the colour than Daubeny made.

Collections.

Although Daubeny's main idea when planning his new building was to provide the College with a room where lectures on Chemistry might be delivered and illustrated with greater safety, convenience, and popularity than in the College Hall, he was probably also guided by the desire to provide a suitable depository for his scientific treasures, the accumulation of a lifetime.

The collections are enumerated in a catalogue printed in 1861, entitled *A Catalogue of the Philosophical Apparatus, Minerals, Geological Specimens, &c. in the possession of Dr. Daubeny, Praelector of Natural Philosophy in Magdalen College, and now deposited in the building contiguous to the Botanic Gardens, belonging to that Society.*

Dr. Daubeny's original arrangement of the collections was for the most part preserved intact until 1893[1], when Mr. Günther found certain changes to be necessary on account of the deterioration of much of the physical apparatus by the corrosive fumes of the Laboratory. The more important portions of the collections were disposed as follows:

[1] Although several pieces of apparatus were found to be missing.

Astronomical Apparatus. The $5\frac{1}{4}$-inch refracting telescope by Cooke was mounted upon the brick arch constructed by Buckler.

There are also in the Laboratory two smaller telescopes, a $2\frac{3}{4}$-inch refractor of 44 inches focal length, purchased from Dollond in 1836 by the Rev. Joseph Cox for £78 15*s.*, and a 4-inch Gregorian reflector, having a silver plate engraved with the arms of Magdalen College and of the donor, and bearing the following inscription: *Coll. Magd. Oxon. D.D. Ricardus Persehowse de Walsall in Com. Stafford. Armiger. Hujus Collegij Sup. Ord. Commensalis & A.M. A.D.* 1755.

Physical Apparatus for the performance of experiments on Voltaic Electricity, Pneumatics, Hydrostatics, Light and Heat, was contained in the cabinets i–x in the gallery of the Lecture Room, while the Static Electricity and Electro-magnetism instruments were grouped in cabinet xxiv in the Apparatus Room, which, being built against a flue, was always dry enough to preserve the frictional machines in working order. Among the treasures of the collection is the early form of Spectroscope by Elliott[1], with immovable telescopes and a hollow glass bottle prism which was presented to Dr. Daubeny by Bunsen.

The **Collection of Chemical Substances** found a place in the remaining cabinets x–xiii in the Lecture Room and also in the cabinets against the east wall of the Apparatus Room. The series of specimens had evidently been collected with considerable care, but owing to the imperfect stoppers to the bottles, to loss or obliteration of labels, or to corrosion by fumes, it is of little value now and will have to be reconstructed.

The other cabinets, xvii–xxiii, in the Apparatus Room contained **Organic Products** and apparatus for analysing the same, as well as apparatus for showing endosmose and exosmose.

The **Glass, Earthenware, and other Apparatus** for ordinary use in the Laboratory was chiefly contained in the cupboards

[1] Repaired by Elliott in 1903.

which were built against the north wall in the gallery, and which completely covered the upper parts of the windows, making the room very dark. The equipment was particularly rich in apparatus for pneumatic chemistry, which was no doubt due to the great interest taken by Dr. Daubeny in the nature of the gases given off by growing plants, volcanos, and mineral waters.

The **Collection of Minerals** was arranged in seventy-seven drawers below the cabinets in the Apparatus Room, in accordance with the chemical system of Rammelsberg[1], under the following heads:

A. Inflammable Minerals.

B. Earths not combined with silica.

C. Minerals consisting of silica, either alone or in combination with water.

D. Silica in combination with bases.

E. Silicates with salts of other acids.

F. Silicious minerals of indefinite composition.

G. Metallic ores.

Two manuscript catalogues of the years 1835 and 1849 are still preserved among the Daubeny papers.

The collection is not at present in its original condition, for a representative series of the best specimens was picked out by Mr. T. G. Heathcote Wyndham, the first Natural Science Fellow of Merton College under the new statutes, and arranged after the modern system in six cabinets especially constructed for their reception under the superintendence of Mr. Hopkins. Unfortunately the labelling and cataloguing of the collection was left undone owing to the premature death of Mr. Wyndham.

In the same room were preserved the marvellous collection of **mineral** and **sea waters** in still more marvellous bottles of all shapes and sizes. 'Mineral waters, as indications of chemical processes going on below the surface of various countries, excited his earnest attention. He carried about a considerable apparatus for examining these waters in their freshest attainable state, and would busy himself for days

[1] *Handwörterbuch des chemischen Theils der Mineralogie*, Berlin, 1841.

in evaporating and analysing on a large scale. Thus he worked in his quarters at one of the hotels in York, just as if he were in his own laboratory at home; and by his busy scrutiny of waters in the volcanic country of central France and the south of Italy, he provoked the suspicious credulity of the natives, who thought he was poisoning their springs, and endangered his personal safety.'—Professor Phillips: *Obituary Notice of Dr. Daubeny*, Proc. Ashm. Soc. 1868.

An early type of bottle (1844) for taking samples of water from the depths of the ocean was also kept here.

The **Geological Collections**, being those in which Dr. Daubeny had the greatest interest, were preserved in the cases which surrounded his private room on the ground floor. Some idea of the size of the collections may be gathered from the fact that the Palaeontological specimens arranged in stratigraphical sequence filled 140 drawers, the Plutonic and Metamorphic Rocks filled thirty-four drawers, the Volcanic rocks, submarine and subaërial, filled 126 drawers, and lastly, the Miscellaneous Collection, consisting of suites of specimens illustrating the geological structure of particular districts, filled 115 drawers.

It is impossible to speak too highly of the method which was adopted for rendering individual specimens in the collections accessible for reference. The printed catalogue gives a list of the more important specimens contained in each drawer under general headings, and often references to memoirs in which descriptions of them may be consulted. Secondly, a fuller manuscript catalogue contains detailed lists of the contents of each drawer; transcripts of these lists are also placed in the drawers, in which the specimens are arranged in rows and numbered consecutively, a new series commencing with each new drawer. And lastly, there is an interleaved copy of Dr. Daubeny's Monograph on *Volcanos* with references to the drawers which contain the specimens described in the book.

Additions to the collections have since been made by Mr. T. H. T. Hopkins and by Mr. R. T. Günther, Fellows of the College. Among the most interesting of the Miscel-

laneous Collections are those of the rocks collected during Daubeny's tour in the United States in 1837–8, Dr. Sibthorp's rocks collected in Greece and the Levant, Phosphorite from Estremadura, and other specimens collected in Spain in 1843 by Dr. Daubeny, and 107 specimens of rocks brought home from one of Captain Parry's three Arctic Expeditions, and purchased at Dr. Buckland's sale.

All these Collections, together with his valuable Library of Scientific Books, passed into the possession of the College after his death, in accordance with the clauses in his will:

Daubeny's Will.

'I give and bequeath to the President and Scholars of Magdalen College absolutely all my minerals and geological specimens, and the philosophical apparatus in the New Buildings erected by me in the year 1848, opposite to Magdalen College, on ground belonging to the said College, together with the printed books on chemical and scientific subjects, and also the best of my microscopes and all its appliances, and also my chemical diagrams.

'And I give to the said President and Scholars one thousand pounds, three pounds per cent. stock, in trust to pay the dividends or annual produce thereof as a salary to some person to be appointed as Curator by the President for the time being, during good behaviour, to take care of the aforesaid specimens and apparatus. And in the selection of such person I recommend, but do not require, that my assistant John Harris shall be first appointed, being satisfied that a person not a member of the University will be best suited to have charge of the Collection. And considering that the value of the Collections, which I give to the College including scientific books, philosophical instruments, specimens of chemical products, rocks and minerals, must have cost me considerably more than three thousand pounds, I trust that the College will adopt such measures as may be necessary to prevent them falling into decay, for which purpose I have left the interest of one thousand pounds stock to a Curator as aforesaid, that he may be responsible for the integrity of the Collections, and render them as useful as possible for the purposes of instruction. The scientific

books will find an appropriate place in one or both of the two rooms over the Laboratory, which were occupied by Mr. Masters, and which after my death will be the property of the College. I would also recommend that an annual visitation be appointed by the President to examine into the state of the Collections from year to year.'—Extract from Dr. Daubeny's Will. Proved January 18, 1868.

Dr. Daubeny died on December 12, 1867, and was buried in College in St. John's Quadrangle, near the west door of the chapel. A white marble tablet upon the west wall of the ante-chapel preserves his memory: Memorial Tablet.

☧
AD · GLORIAM · DEI
ET · IN · MEMORIAM
CAROLI · ÆGIDII · BRIDLE · DAUBENY · M.D.
ANNOS · LI · HUIUSCE · COLL · SOCII
LITERARUM · HUMANIORUM · EXIMIE · DOCTUS
CHEMIAE · BOTANIAE · GEOLOGIAE
SCIENTIA · INSIGNIS
AMICIS · AMICISSIMUS
TAM · ACADEMIAE · QUAM · COLLEGIO · DEVINCTUS
DEUM · TOTA · MENTE · COLUIT
IN · CHRISTO · OBDORMIVIT
DIE · MENSIS · DECEMBRIS · XIII
A · S · MDCCCLXVII
ÆTATIS · LXXIII
AVE · ANIMA · SIMPLEX · PIA · DESIDERATISSIMA.

After Dr. Daubeny's death, the history of the Laboratory is interrupted for a brief period. There is no doubt that Mr. Hopkins, who had been a pupil of Dr. Daubeny, and had lectured for him, continued to work in it, and give instruction; but we have no official record of an appointment till that of Mr. Edward Chapman as Lecturer in 1869; though attached to the College, he was not made a Fellow until 1882, when he was elected under the powers given to the College by the new statutes of the Commission of 1881. E. Chapman, 1869–94.

From 1869 to 1894 Mr. Chapman, first as Lecturer and then as Tutor, was charged with the responsibility of the scientific instruction of the members of the College, which he carried on in the Laboratory, associating with himself

Combined Lectures.

teachers in other Colleges by a system of combined lectures, Merton, Jesus, Trinity, Wadham, and Balliol at various times entering into the combination. During the early part of his tenure of office he entirely renewed a large portion of the collection of chemical substances and reagents, and labelled them in accordance with the modern nomenclature. On the institution of the Preliminary Examination in the Honour School, he commenced and carried on for many years a series of lectures on Physics, a subject since treated specially at the Millard Laboratory.

Report to Commission on Scientific Instruction.

An account of the machinery at work for the teaching of Physical Science at Magdalen College in the year 1870 was printed in an appendix to the reports and minutes of evidence of the Royal Commission on Scientific Instruction [1].

Mr. Chapman then stated, for the benefit of the Commissioners, that the method of teaching was:

1. 'A course of advanced lectures intended for candidates for honours in the Physical Science School. These lectures combine formal teaching in a class with attention to the individual requirements of each candidate in private.

2. 'A course of lectures on elementary chemical physics, intended for beginners. These lectures are not given with the view of training men necessarily for the Physical Science School, but as a means of general education, in the hope that an intelligent interest may be excited in the mind of the student, and habits of observation and accuracy established.'

In conclusion Mr. Chapman laid great stress on the importance of supplementing the teaching work of the professors of the University 'by taking care that each student in Physical Science shall receive the same help and attention from his College Tutor as that enjoyed by the classical or mathematical candidate. I am the more confirmed in this view, as I have found that such a system often reaches men who, but for the fact that the subject was brought to them in College, would never have taken up the study at all.

[1] *Royal Commission on Scientific Instruction and the Advancement of Science*, vol. i. First, supplementary and second reports with minutes of evidence and appendices. [C. 536.] London, 1872.

'Considerable experience in tuition has convinced me that Physical Science as an instrument of education will flourish the better in Oxford the more it becomes an integral part of our College System.'

The replies which the Commissioners received from the various Oxford Colleges show very clearly the pioneer part which the Daubeny Laboratory, under Mr. Chapman's direction, took at this time in supplementing the professorial teaching centred at the University Museum.

Biological Teaching.

In 1874 a new and important development in the teaching of the University took place, when Messrs. Chapman, Lawson, and Yule arranged courses of instruction in biological subjects on new lines. To these courses of instruction our physiological teaching on modern lines traces its origin, and owing to them the Daubeny Laboratory came by the name of the Physiological Laboratory.

The Biological Courses at the Daubeny Laboratory were, no doubt, intended to supplement the deficiencies in the University Courses. In a syllabus of about 1875, we see that a minute practical study was made of the Plasmodium of Aethalium, of Amoeba, Actinosphaerium, Monocystis, and two other Gregarines, Paramoecium, Vorticella, Acineta, and Hydra. Another syllabus included Zygnema, Tradescantia, Yeast, Pleurococcus, Gloeocapsa, Palmella, Nostoc, Oscillatoria, Bacterium, Chlamydococcus, Volvox, and Spirogyra. Courses on Histology and Physiology were arranged by Mr. Yule.

The lectures were open to Magdalen, Merton, and Trinity men, and though the beginnings were modest, yet might the originators with justice have quoted the words, 'We shall light such a candle as shall never be put out,' at any rate we hope not in Oxford.

Lectures to Artisans.

In 1876 a series of more popular lectures and practical demonstrations in Physiology, by Mr. Yule in conjunction with Professor Lawson on Vegetable Physiology, and Mr. Chapman on Chemical Physics, was delivered to a class of artisans in the Laboratory, which was lent by the College for that purpose. A lecture was delivered every Saturday evening, at

seven o'clock, of about an hour's length, and the two following hours were employed in practically verifying by dissection and experiment the leading points of the lecture, for which purpose each student was supplied with a working-place to himself and the apparatus necessary for his work. The numbers were restricted to eight, and Mr. F. J. Bell, now Professor of Comparative Anatomy at King's College, London, assisted both in the teaching and preparation of the lectures.

C. Yule's Physiological Course.

Mr. C. J. F. Yule, although originally a Brackenbury Scholar of Balliol, migrated to Cambridge, where, as a Scholar of St. John's College, he had studied Physiology with Michael Foster, and was known by a paper on Urari when elected to a Fellowship at Magdalen. On his return to Oxford he found that work along modern lines was impossible in the University Laboratories, for Professor Rolleston, although nominally the Linacre Professor of Physiology, was devoting his chief attention to Comparative Anatomy, and had not followed the latest developments of Physiological Research.

The thorough nature of Yule's Physiological Course is indicated by the syllabus compiled by him in 1878, entitled *Syllabus of a Year's Course of Practical Work in the Physiological Laboratory of Magdalen College, Oxford.* Circulation and Respiration were studied in the Michaelmas Term, the Nervous System in the Lent Term, while the Easter Term was devoted to Digestion and Animal Chemistry.

From this development in the teaching the need for modern instruments of precision naturally arose, and the College voted in 1876 a grant for the purpose of procuring them. Of the apparatus which was then added to our collections we cannot speak too highly, for without the Oertling Balance, the Elliott-Thomson Galvanometer, and the Chronographs, much good research could not have been accomplished.

Mr. Yule still further increased the efficiency of the Laboratory for Physiological Research, by causing it to be registered as a place where experiments upon living animals could be carried on. At his request the College passed the following Order: 'That the College consent to their Laboratory being registered under 38 and 39 Victoria, Cap. 27, for

the performance of experiments under the said Act' (Meeting of October 13, 1877). The licence was granted by the Home Office on October 25, 1877.

The University Physiological Laboratory had not so much as been thought of in those days, and was not opened for work until 1885. Many therefore availed themselves of the opportunity for quiet study which the College Laboratory, the only Physiological Laboratory in Oxford, afforded. Among them my friend Dr. Dixey, who, in relating some of his experiences of these early days, enlarged on the benefit he had obtained from it, and extolled Yule's undoubted genius. We find that on February 9, 1882, the latter, applying for a renewal of the licence, could write, 'I am at present the only person teaching Physiology in this University.' And Professor Burdon-Sanderson, on coming to Oxford from University College, London, in 1882, as Waynflete Professor of Physiology, found the Daubeny Laboratory suitable for his experimental work. There was no laboratory connected with his Chair.

The small rooms on the upper floor were at this time devoted to Physiology, and the westernmost was specially fitted up as a dark room for Professor Burdon-Sanderson, and there, assisted by Dr. Gotch, he carried on his researches on Dionaea [1].

Physical Teaching.

Meanwhile, work in other branches of science was not neglected, for in the summer of 1876 Mr. Lazarus Fletcher, the present Keeper of the Mineralogical Department in the British Museum, on his appointment as Millard Lecturer in connexion with Magdalen, Merton, and Trinity Colleges, conducted a course in Optics and other branches of Elementary Physics in the Laboratory. When in 1879 he became an assistant at the British Museum, Mr. Jupp, a mathematical Demy, and later science master at Clifton College, acted as his deputy, and at a later date, Mr. Dixon, now Professor of Chemistry at Owens College, Manchester.

[1] J. Burdon-Sanderson, *On the Electromotive Properties of the Leaf of Dionaea in the Excited and Unexcited States.* Second Paper. *Philosophical Transactions*, vol. 179, pp. 417–49. 1888.

H. B. Dixon's Research on Rate of Explosion in Gases.

Professor Dixon's connexion with our Laboratory is best explained in his own words—

'I had been working on the explosion of gases in the Christ Church Laboratory, 1876–9. On my election to a lectureship at Balliol and Trinity I continued the work in the Balliol Laboratory, and made some attempts to measure the rate of explosion of gases. I think it was in 1881 that my friend, C. J. F. Yule, Fellow of Magdalen, showed me round the Magdalen Laboratory, and explained the electric chronograph with which he had been doing physiological experiments. This instrument seemed to be adaptable to my wants, so as he was no longer using it, I asked him to let me try it on my gases. This he allowed me to do, and I soon found it would accurately record the very rapid movements of the explosions. Accordingly I got leave from the College to work in the Laboratory, and I worked there for about two years. In 1883 or 1884 I bought the chronograph from Magdalen, and removed it to Balliol.

'During 1882 and 1883 I used to go to the Magdalen Laboratory in the afternoons, and sometimes evenings.

'I used the chronograph to determine the initial rate of explosion of mixtures of carbonic oxide and oxygen with different quantities of moisture, and also for measuring the rate of the "explosion-wave" in gases under different conditions. My results were published in a memoir, "On the Conditions of Chemical Change in Gases," *Phil. Trans. R. S.* 1884, and in the Bakerian Lecture for 1893, "On the Rate of Explosion in Gases," *Phil. Trans.* 1893.

'I occasionally met the Rev. T. H. T. Hopkins in the Laboratory, and he became interested in my work. He gave me a piece of apparatus which had belonged to Daubeny. I remember watching with him some of the sunset "glows" (the after-effect of the eruption of Krakatoa) from the Laboratory windows.'—Extract from a letter from Professor H. B. Dixon to the author.

A tradition is extant in the Laboratory that there was a great depletion of chemical glass during Mr. Dixon's sojourn there, on account of the destructive nature of his research.

It is always a matter of gratification to the Biologist when, for the purposes of his own research, he has invented or improved some instrument, with such success that by its means a new field of discovery has been opened in the more exact sciences of Chemistry and Physics. The Physiologist, in striving to measure the minute space of time required by a nervous impulse to travel along its conducting path, had brought the electric chronograph to such perfection that Dr. Dixon was able to measure the velocity of explosion waves in gases by it, and Mr. Jervis-Smith has been able to adapt the same instrument to record the velocity of bullets at the moment of leaving the barrel of a rifle. The microscope also owes its perfection chiefly to the requirements of Biological Research, and the best test-objects for it are still supplied by the organic world. And, finally, the Sprengel pump, without which electric glow-lamps would have remained undiscovered, was the invention of a Physiologist.

It is by such means that the Biological Sciences are able to repay part of the debt they owe to Chemistry and Physics, and we are pleased to think that our Physiological Laboratory should have contributed towards the payment of that debt in providing Dr. Dixon with the instruments by which his valuable results were obtained.

Instruction in Practical Chemistry.

To continue the account of the teaching in the Laboratory in recent times, it only remains to be said that the resources of the institution have been chiefly devoted to Practical Chemistry. The courses of instruction which were originally arranged under Mr. Chapman have become more and more popular, and are being ably conducted by Mr. J. J. Manley, who succeeded Mr. J. Harris as Daubeny Curator in 1888; and many men from other colleges, being attracted by the facilities afforded for study, have applied for admission. Owing to limited space the instruction is advisedly principally confined to Quantitative work.

Schoolboys.

A new departure was made in Lent Term, 1889, when the Laboratory (built in 1863) belonging to Magdalen College School was refitted for Analytical Chemistry by the Rev. W. E. Sherwood. Lectures in Chemistry, Optics, Heat,

Electricity and Magnetism were arranged for the boys studying Science at the School, and have been delivered by Mr. Manley in the College Laboratory twice a week. The lectures cover such portions of the subjects as are required for the Oxford and Cambridge Higher and Lower Certificates.

Preliminary Physics.

In 1891 the Regulations of the Board of the Faculty of Natural Science were modified, so as to require from candidates for the Preliminary Examination in Physics a practical knowledge of certain elementary physical experiments. Mr. Chapman obtained a special grant from the College for the purchase of apparatus suited for these new requirements, and the easternmost room on the upper floor was adapted for a course of instruction.

The wisdom of rendering the Laboratory equipment fitted for instruction in the subjects for the Preliminary Examination was strikingly exemplified when, a few years after, the University Laboratory was so crowded that several undergraduates commencing the subject could not be accommodated there.

Physical Chemistry.

Some ten years later a new departure was made in the course of Physical Chemistry which was arranged by Messrs. Wilson and Manley. For many years the subject of Physical Chemistry had been required of all candidates seeking honours in the Final Chemistry School, but there was no adequate provision in the University for practical instruction in this most productive field of chemical study.

Need for extension.

In 1901 the main fabric of the Daubeny building was in practically the same condition as it was in the middle of the nineteenth century. A roof over the main staircase had been replaced, and a high-pressure water heating apparatus had been introduced instead of the old low-pressure boiler, which had remained in a useless state for many years, but no structural improvements had been effected.

The need for extension and rearrangement arose, firstly, because the number of students receiving practical instruction in Chemistry and Physics in the Laboratory had largely increased, and secondly because the purposes for which it was desired to use the building were found to interfere with

one another, and the ventilation was bad. Beginners in Chemistry, preparing for Preliminary Examinations, worked in the same room as advanced students engaged in quantitative operations of a refined order; consequently the results obtained by the latter were often in danger of being vitiated by the deleterious fumes liberated by the former. In spite of all precautions the vapours permeated the cupboards and cabinets in the gallery, and rendered them unsuitable for the collections and apparatus contained therein. All brasswork left in them became deeply corroded. And occasionally the obnoxious fumes, ascending to the upper parts of the building, would enter the rooms devoted to the apparatus and operations of the Physicists. In short, the improvement of the Laboratory building was imperative.

A Committee appointed by the College Order of March 13, 1901, to consider the question of the extension of the Daubeny Laboratory, reported as follows:

Report of Committee.

'They are agreed in thinking it is desirable to improve the Daubeny Laboratory with a view to carrying on more effectively the teaching and practical work at present done there, mainly in Preliminary Chemistry, but also to some extent in Preliminary Physics.

'The alternative methods of doing this appear to be, either to add to the existing premises by building on toward the west, on the ground at present occupied by sheds, &c., between the existing premises and the telescope tower, or entirely to gut and rearrange the existing premises.

'The Committee recommend the former course as leaving the present building available for present purposes other than the teaching of Chemistry, including the teaching of Physics, and the provision of a Museum for the Daubeny apparatus, and also as furnishing space for what is much needed, a Lecture Room, while providing at the same time more and better accommodation for the teaching of Chemistry and for Chemical research in the premises to be added.

'They recommend that if the College decides to entertain the proposal to improve the Laboratory, they be reappointed with instructions to obtain exact drawings and estimates for

such additions and rearrangement, and also to report on the probable cost of maintenance of the Laboratory as so improved' (January 25, 1902).

The new Laboratory.

At the March Meeting the first-mentioned plan for the improvement was adopted, and the new Laboratory was commenced before the end of Lent Term, 1902, between the old Lecture Room and the telescope, and was finished by the end of the following Long Vacation. The foundation stone was laid over a dated fragment of the *Times* and a new coin of the realm, and bears the following inscription:

LAPIS · HIC · ANGVLARIS
A · THOMA · HERBERTO · WARREN
ANNO · PRAESIDATVS · XVIIMO
A · D · IX · KAL · MAI · IACTVS · EST.

The new building consists of two laboratories one above the other, an entrance hall, and a cellar for stores and the heating apparatus. Access to the upper story was by a new staircase which, to save space, was inserted between the old building and the wall of the Botanical Garden. The old doorway in the middle of the north side of Dr. Daubeny's Lecture Room was replaced by a window; a doorway to communicate with the new hall being opened in the place of the end window shown in Plate 2. The little brick-paved court to the east of the old building was roofed over and is used as a still-room for the preparation of distilled water; and the chamber under the telescope, provided with a wood-block floor and lighted by a new window cut through the western wall, has made an excellent workshop.

The principal changes which have been effected in the interior are the conversion of the large Laboratory into a lecture room, by the removal of the benches and cupboards to the new room on the ground floor, and also by the removal of the cupboards which covered the windows above the north gallery, shown in Plate 2. The floor, weakened by dry rot owing to deficient ventilation, had to be almost entirely renewed. The Science Tutor's Room, formerly Dr. Daubeny's study (Plate 3), was equipped for the performance of experiments in Physical Chemistry, for which the situation near the

THE PRIVATE ROOM OF THE TUTOR IN NATURAL SCIENCE, C. 1870-94
ORIGINALLY DR. DAUBENY'S STUDY

From a water-colour drawing in the possession of Mr. Edward Chapman, M.P. by whom this plate is presented

ground rendered it better adapted than were any of the rooms on the upper floor, the easternmost of which, until now the Physical Chemistry Room, became the private room of the Tutor in Natural Science. The other three rooms, used as the Photographic, Curator's, and Elementary Physics rooms respectively, were left undisturbed.

The new Chemical Laboratory on the upper floor, measuring thirty-nine feet long by sixteen feet broad by eleven feet high was designed as a beginners' laboratory. The positions and proportions of windows and intervening piers were dictated by the number and breadth of the benches, which it seemed advisable to introduce into the space at our disposal. Flues for carrying away fumes from draught hoods were made of three-inch drain-pipes inserted in the walls during the building. The walls for a space of three feet above the benches are covered with panes of 'opalite' glass keyed on to cement, producing a surface which is easily kept clean. The draught cupboard is of glass and wood, built upon a bed of slate—which, in our experience, has proved to be more durable than lead—between the splays of a window so as to be thoroughly well illuminated.

The bench-tops are of well-seasoned kauri pine, painted beneath with a coat of red lead paint to prevent shrinkage or expansion due to alterations in the hygrometric state of the air, and treated above with paraffin wax melted into the pores of the wood with a flat iron, as a protection against corrosion. Cupboards and drawers beneath the benches for the students have been dispensed with on account of the great difficulty in preventing them from being used as receptacles for apparatus put away unwashed; the bench-tops have thus been kept at a lower and more convenient height than is customary in chemical laboratories.

The room on the ground floor, which is somewhat shorter than the upper room, was intended as a research laboratory. It has been furnished almost entirely with material from the old Laboratory. At the present time it is being used by Mr. N. V. Sidgwick, Fellow of Lincoln College, for the preparation of the experiments in illustration of his lectures on Organic Chemistry, and by Mr. H. E. W. Phillips.

APPENDIX A

The Meteorological Record.

Meteorological Records. Daubeny, 1861–7.

The earliest weather records kept at the Laboratory which have been preserved were those made by Dr. Daubeny himself, and they consist of barometric and thermometric readings entered in small 8vo diaries. But inasmuch as the learned doctor only recorded his own personal observations, and was often away from Oxford, his meteorological record from 1861 to October 31, 1867—though fairly complete as regards his own environment—lacked continuity, for observations on the climate of Rome or Naples would be sandwiched between records of Oxford weather. Nevertheless his observations of the quantity of ozone present in the atmosphere, both at Torquay and at Oxford, were of especial value, and a summary of them is contained in a paper *On Ozone and its Disengagement by the Leaves of Plants*, published in the *Journal of the Chemical Society*, January, 1867.

J. Harris, 1869–73.

After Dr. Daubeny's death there is a gap of a year in the record, and then a more systematic series of observations with standard instruments was commenced. The installation of the instruments and the method of observation were due to Mr. T. H. T. Hopkins, but the observations were made by John Harris.

In 1869 Mr. E. Chapman took over the superintendence of the Meteorological Observations, and in this he was assisted by J. J. Manley after the retirement of John Harris.

The Daubeny Laboratory is situated about 191·62 feet[1] above sea-level, and therefore rather lower than the Radcliffe Observatory. The difference of twenty feet in the altitudes of

[1] The height of a brass plate on the plinth of the building above mean sea-level. This height was obtained by levelling from the Ordnance Survey Bench Mark at the foot of Magdalen Tower.

the lowest rain gauges at the two stations seems to account for a perceptible difference in the annual rainfall observed.

Description of the Meteorological Instruments[1].

1. **A Standard Cistern Barometer**, No. 729, by Negretti and Zambra[2]. Examined and certified by J. Glaisher, Esq., F.R.S. Its readings require to be increased by 0·005 inch for index error and capillarity, and further corrected for difference of readings of attached thermometer from 32° by application of corrections for barometers with brass scales[3].

Example of reading with reductions and corrections—

Barometer	29·998	actual height read off on vernier.
	+·005	for capillarity.
	30·003	
	−·076	for temperature at 57° F.
	29·927	
	+·203	for sea-level[4].
	30·130	Reduced reading.

2. **Thermometers.**

One sensitive spirit minimum[5], with forked bulb, placed on the grass.
One sensitive spirit minimum[5], with forked bulb, placed one foot above it.

(α) Exposed. One maximum solar radiation thermometer, with dull black bulb in vacuo, by Casella. In wire cage on the grass before the Laboratory.

(β) In the Shade. One maximum (mercury) } thermometer, with Phillips's index.
One minimum (spirit) }
One wet } bulb thermometer. Fastened in wooden
One dry } case to wall, with northern aspect.

[1] This description is, in the main, based upon a printed plan drawn up by Mr. Edward Chapman, to whom the arrangement of the register books is also due.

[2] Presented to the Laboratory by Mr. Chapman.

[3] *Table of Corrections for Barometers with Brass Scales*, by James Glaisher, F.R.S. London: Taylor and Francis, 1856.

[4] The cistern of the instrument stood 191·62 feet above sea-level.

[5] Both made by Casella, and verified at Kew Observatory.

(γ) One portable thermometer in copper case for taking the water temperature.

3. **Rain Gauges.** Made of copper, let into stone bed.

(α) Diameter 5 in. Height at top { above ground 1 foot. above sea-level 190 feet.

(β) Diameter 5 in. Placed on roof { above ground 20 feet. above sea-level 210 feet.

4. **Ozone Cage**, for Schönbein's paper.

5. **Anemometer**, above roof, by Casella.

6. **River Gauges** in the Cherwell.

(α) 120 yards below Magdalen Bridge [1].

(β) 130 yards above α. A scale of feet marked in cement fixed against a wall.

Order in which the Observations are taken.

Time, 10 a.m.[2]

1. The temperature of the barometer is read off from the attached thermometer, the cistern-level adjusted after gently tapping the instrument, and the height of the column read off on the vernier and entered. The corrections as above are made afterwards.

2. The solar maximum radiation, and the minimum thermometer on the grass and 1 foot above it, are read and adjusted.

3. The maximum and minimum, together with the wet and dry bulb thermometers, are read and adjusted. The degree of humidity is found from Bone's tables [3].

4. The rain gauge is visited [4]. The rainfall is measured and entered on the spot.

5. The river temperature on the surface and 3 feet below

[1] This instrument consists of a simple float in a well freely communicating with the Cherwell. The float bears a rod graduated in feet and inches, which indicates its position and the height of the water. The graduations are so arranged that zero on the scale corresponds to a mean height; it is about 186 feet above sea-level.

[2] The observations were taken at 9 a.m. before Jan. 1, 1873.

[3] *Tables for Mason's Hygrometer*, by Wm. Bone, Esq. London: Jones, Optician, Charing Cross.

[4] Should rain be falling at 10 a.m., the rain gauge is visited immediately after reading the barometer.

the surface is read from a thermometer placed there by the observer on his way to the rain gauge.

6. The height at which the water stands is noted by reference to the river gauge, and during floods the rise or fall is observed and recorded several times daily.

7. The direction and force of wind, the kind and amount of cloud, and the weather, as required by Beaufort's scale, is entered.

8. The ozone paper is removed from the ozone cage, a fresh piece fastened in, and the amount of ozone entered according to the ozone colour scale; the exposed paper having been dipped in distilled water before comparing it with the scale.

The observations are entered in oblong tables measuring 16 inches by 10 inches. Each table is constructed for one month's observations, and the variations of the barometer, thermometer, and rainfall are summarized in curves on the opposite page.

Temperature of Cherwell.

The continuous series of observations commenced by Mr. Hopkins, and carried on and much extended by Mr. Chapman, were found to be of great value when the British Association appointed a special Committee, consisting of the Hon. Ralph Abercromby, Dr. A. Buchan, Mr. J. Y. Buchanan, Mr. J. Willis Bund, Professor Chrystal, Mr. D. Cunningham, Professor Fitzgerald, Dr. H. R. Mill (*Secretary*), Dr. John Murray (*Chairman*), Mr. Isaac Roberts, Dr. H. C. Sorby, and the Rev. C. J. Steward, to inquire into and to report upon the Seasonal Variations of Temperature in Lakes, Rivers, and Estuaries in various parts of the United Kingdom, in co-operation with the local societies represented on the Association.

The records of the temperature of the Cherwell kept at the Daubeny Laboratory were warmly commended by the Committee, who directed especial attention to 'Mr. Chapman's magnificent series of mean monthly temperatures, which illustrate very clearly the variations in the seasonal swing of temperature in water in one of the most extreme average climates of the British Islands, taking its low altitude into account. It serves not only to record the variations in

temperatures of the Cherwell, but to suggest the range of deviations from normal seasonal temperatures to be expected in any case. Thus we are warned not to assume the mean of one or two years as being the real mean temperature of any exposed body of water' (*British Association Report* for 1891, p. 19). And the second series of averages for twelve years, which we now publish, demonstrates this still more clearly.

Observations of the temperature of the Cherwell were made regularly every morning since 1878 by Mr. Edward Chapman or by his assistant, and have been continued since his resignation in 1894, up to date. The ordinary meteorological observations having been made at the same time, make it possible to compare river temperature, air temperature, and rainfall. The river temperature recorded below is the mean of daily observations at 10 a.m., the air temperature is the mean of the maximum and minimum thermometer in the shade for the previous twenty-four hours, and the rainfall is the amount in inches which fell in the previous twenty-four hours.

The length of this series of observations gives it peculiar value in affording an indication of average conditions. The average air temperature for the twenty-two years was 49°·5, the average water temperature at 10 a.m. 50°·9, or 1°·4 warmer than the air; the mean annual rainfall for these years being 23·6 inches. The year of lowest air temperature was 1887, with 47°·6, the average water temperature for that year being 49°·8 and the rainfall 18·78 inches, very exceptionally low. The lowest mean water temperature was in 1888, 49°·0, when the mean air temperature was 47°·9 and the rainfall 27·39 inches. The highest air temperature was 51°·2, the mean of 1893, when the water temperature was also highest, 53°·5, and the rainfall was 16·51 inches. In 1890, the year of the next lowest rainfall, when only 17·02 inches fell, the temperatures of air and water were almost at their average (49°·0 and 50°·8 respectively); while in 1903, which was the wettest year, with 35·14 inches of rain, the air temperature was nearly normal (50°·1), and the water temperature was also very near the average

(50°·7). The difference between the average temperature of the warmest and coldest year recorded was only 2°·5 for the water.

The highest mean temperature of the water for any month was 69°·2 in September 1893, in a month with a low rainfall, but in the year of the highest average air temperature. The lowest mean temperature of the water was 32°·4 for January 1891 (air 32°·6), but the lowest air temperature was 29°·2 for December 1890, when the water had a mean of 33°·3.

The difference in average temperature of water for the same month in different years was greatest in the months of annual maxima and minima. The hottest June was 12°·7 warmer than the coolest June; the warmest January was 10°·6 warmer than the coldest January. But it does not clearly appear that at the time of annual average temperature the difference was least; for the warmest April was 9°·3 and the warmest September 12°·3 above the temperature of the coldest month of the same name.

On the average the air temperature came nearest the water temperature in the winter months, notably in November and January, when they almost coincided, and the two temperatures diverged most in the summer months, April to July, when the difference averaged 2°·3. During the twenty-two years of observation the average monthly air temperature was higher than the average monthly water temperature at 10 a.m. on forty-six occasions. Of these ten occurred in January, nine in February, ten in November, and seven in December, or thirty-six in the winter months; four were in March, one each in April, May, July, and August, and two in October. In no June or September, between 1882 and 1903, has there been an instance of air being warmer than water on the average of a whole month. Of course, in the observations now recorded the comparison is made between average air temperature for the whole twenty-four hours, and average water temperature at 10 a.m. only.

Mean Monthly Observations on the Temperature of the River Cherwell at Oxford.

1882.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	41·3	36·0	38·6	41·8	1·13
February . .	42·3	36·6	39·4	41·7	1·75
March . . .	48·0	38·0	43·0	46·8	1·18
April . . .	51·3	40·5	45·9	51·0	3·78
May . . .	58·1	45·1	51·6	57·3	1·66
June . . .	61·0	49·7	55·3	53·9	3·08
July	64·0	53·0	58·5	63·6	3·56
August . . .	67·6	53·2	60·4	62·9	1·36
September .	63·1	46·0	54·5	57·3	2·08
October . .	56·2	44·2	50·2	50·9	5·54
November. .	48·5	37·3	42·9	41·9	3·41
December. .	43·1	34·6	38·8	40·3	3·20
Year . . .	—	—	48·3	50·8	31·73

1883.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	45·7	37·0	41·3	41·0	2·29
February . .	48·2	37·3	42·7	42·4	3·60
March . . .	43·7	29·7	36·7	39·9	0·99
April . . .	53·3	38·5	45·9	49·9	1·07
May. . . .	62·0	44·7	53·3	56·3	1·94
June . . .	69·9	50·9	60·4	62·5	4·35
July. . . .	69·7	52·5	61·1	62·6	3·53
August . . .	71·3	53·2	62·2	63·2	0·70
September .	65·0	50·5	57·7	58·7	4·50
October . .	56·6	44·1	50·3	51·2	1·90
November. .	48·8	36·1	42·4	43·0	3·11
December. .	44·7	36·4	40·5	41·1	0·54
Year . . .	—	—	49·5	51·0	28·52

1884.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	47·1	39·3	43·2	42·1	2·30
February . .	47·5	37·1	42·3	42·6	1·32
March . . .	51·3	36·3	43·8	45·2	1·41
April . . .	54·0	41·2	47·6	49·1	1·69
May	65·3	44·3	54·8	51·3	0·80
June . . .	69·0	50·4	59·7	61·5	2·05
July	73·5	54·9	64·2	64·9	2·25
August . . .	75·7	53·9	64·8	66·8	1·52
September .	67·9	51·3	59·6	61·1	1·36
October . .	57·0	42·0	49·5	51·9	0·97
November . .	47·5	36·2	41·8	43·0	1·74
December . .	43·9	36·0	39·9	38·4	2·07
Year . . .	—	—	50·9	51·5	19·48

1885.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	40·3	32·1	36·2	34·0	2·17
February . .	48·5	38·2	43·3	41·2	2·67
March . . .	48·2	33·6	41·9	42·7	1·10
April . . .	55·9	38·3	47·1	49·1	1·72
May	59·2	41·8	50·5	54·3	2·03
June . . .	70·4	50·7	60·5	63·1	1·67
July	74·9	54·3	64·6	66·5	0·18
August . . .	68·3	50·9	59·6	60·8	1·56
September .	63·9	47·3	55·6	57·0	4·36
October . .	52·6	39·9	46·2	47·2	3·89
November . .	46·7	38·0	42·3	41·4	3·51
December . .	42·5	33·1	37·8	37·5	1·02
Year . . .	—	—	48·8	49·6	25·88

1886.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	40·5	31·0	35·7	35·1	4·00
February . .	38·7	29·6	34·1	35·7	0·68
March . . .	46·3	33·9	40·1	39·5	1·61
April . . .	55·6	39·2	47·4	47·7	2·13
May	61·8	44·0	52·9	53·4	4·58
June . . .	67·9	50·1	59·0	59·9	1·14
July	73·4	53·9	63·6	65·9	3·39
August . . .	71·7	54·4	63·0	64·0	1·65
September .	66·7	50·6	58·6	60·1	2·27
October . .	59·2	47·5	53·3	53·1	3·16
November . .	49·2	38·5	43·8	43·5	2·50
December . .	41·3	31·3	36·3	36·5	5·01
Year . . .	—	—	49·0	49·5	32·12

1887.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	38·7	29·9	34·3	35·2	2·16
February . .	42·1	33·3	37·7	39·8	0·67
March . . .	44·2	31·9	38·0	40·5	1·58
April . . .	53·5	35·9	44·7	47·8	1·11
May	58·8	43·5	51·1	53·7	1·51
June . . .	71·2	51·4	61·3	64·5	1·56
July	78·0	54·9	66·4	68·7	0·71
August . . .	72·4	51·4	61·9	64·5	2·20
September .	62·7	47·4	55·0	56·9	2·10
October . .	50·3	38·2	44·2	46·8	1·96
November . .	44·3	34·9	39·6	40·8	1·85
December . .	42·3	32·1	37·2	37·7	1·37
Year . . .	—	—	47·6	49·8	18·78

1888.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	41·1	32·0	36·5	36·5	0·70
February . .	33·3	31·4	32·3	34·7	3·38
March . . .	42·0	32·8	37·4	38·3	2·94
April . . .	51·2	37·3	44·2	45·4	1·59
May	63·0	43·8	53·4	56·8	1·18
June . . .	67·6	50·2	58·9	61·0	3·19
July	67·6	52·1	59·8	61·0	4·44
August . . .	68·1	51·4	59·7	60·9	1·97
September .	64·0	48·6	56·3	57·8	1·13
October . .	54·4	38·3	46·3	47·6	0·77
November . .	57·8	42·2	50·0	46·8	4·13
December . .	44·4	35·9	40·1	42·0	1·97
Year . . .	—	—	47·9	49·0	27·39

1889.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	40·2	31·9	36·0	38·1	0·66
February . .	43·1	32·4	37·7	38·0	1·82
March . . .	48·2	34·7	41·4	41·9	1·69
April . . .	52·5	39·2	45·8	47·5	2·51
May	66·0	48·9	57·4	57·8	2·91
June . . .	71·1	53·1	62·1	64·3	1·90
July	70·9	53·5	62·2	64·7	2·69
August . . .	69·3	52·0	60·6	63·4	2·29
September .	65·3	49·4	57·3	59·2	1·49
October . .	54·9	42·0	48·4	49·6	2·36
November . .	45·8	39·5	42·6	45·3	0·88
December . .	41·9	31·8	36·8	37·3	1·04
Year . . .	—	—	49·0	50·6	22·24

1890.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	46·8	36·9	41·8	41·5	1·86
February . .	43·2	32·8	38·0	39·3	0·71
March . . .	50·4	36·2	43·3	43·6	0·72
April . . .	53·8	38·0	45·9	48·6	1·03
May. . . .	65·3	45·2	55·2	58·3	1·75
June . . .	69·4	50·3	59·8	61·9	1·51
July	69·6	53·2	61·4	63·7	2·96
August . . .	69·4	52·2	60·8	63·4	2·26
September .	68·6	50·5	59·5	60·2	1·02
October . .	57·1	42·4	49·7	51·2	1·14
November. .	48·5	37·7	43·1	44·4	1·51
December. .	32·8	25·7	29·2	33·3	0·55
Year . . .	—	—	49·0	50·8	17·02

1891.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	38·0	27·2	32·6	32·4	1·40
February . .	45·3	32·1	38·7	39·3	0·00
March . . .	46·5	34·0	40·2	40·5	1·55
April . . .	52·9	36·5	44·7	46·9	1·41
May. . . .	59·7	42·5	51·1	54·4	2·15
June . . .	70·9	52·0	61·4	63·6	1·27
July	70·7	52·4	61·5	64·5	2·14
August . . .	67·5	52·0	59·7	61·3	4·51
September .	66·8	49·9	58·3	59·4	1·34
October . .	56·6	44·0	50·3	51·1	5·63
November. .	47·3	37·9	42·6	44·0	2·10
December. .	44·0	34·5	37·2	40·1	2·97
Year. . .	—	—	48·4	49·8	26·47

1892[1].

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	40·3	31·5	35·9	36·6	·47
February . .	44·6	33·9	39·2	39·2	·74
March . . .	43·9	30·3	37·1	39·3	·39
April . . .	58·2	36·4	47·3	50·4	·72
May. . . .	64·8	45·3	55·0	57·0	1·15
June . . .	70·9	48·5	59·7	63·1	1·70
July. . . .	69·3	51·7	60·5	62·3	2·71
August . . .	70·9	53·3	62·1	63·9	2·97
September .	64·5	48·1	56·3	58·3	2·23
October . .	52·6	39·1	45·8	47·6	3·09
November. .	48·8	38·6	43·7	45·2	1·67
December. .	40·9	31·0	35·9	37·9	·89
Year. . .	—	—	48·2	50·0	18·73

1893.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	39·0	31·2	35·1	34·4	1·57
February . .	46·7	36·5	41·6	41·1	2·58
March . . .	55·1	35·6	43·5	45·9	·28
April . . .	64·3	40·4	52·3	54·7	·05
May. . . .	69·0	49·6	59·3	63·0	·77
June . . .	73·4	51·6	62·5	64·3	·67
July. . . .	74·6	55·7	65·1	66·6	3·48
August . . .	76·2	56·2	66·2	67·0	·92
September .	66·8	48·2	57·5	69·2	·62
October . .	58·6	43·7	51·1	53·4	2·56
November. .	46·7	35·7	41·0	40·8	1·46
December. .	45·1	33·5	39·3	39·4	1·57
Year . . .	—	—	51·2	53·5	16·51

[1] The calculation of the averages of the years 1892–1903 was kindly undertaken by Mr. P. F. Timms, of the Bursary, Magdalen College.

1894.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	42·5	33·1	37·8	37·9	1·67
February . .	46·8	35·8	41·3	41·8	1·42
March . . .	52·4	35·9	44·1	45·1	1·47
April . . .	61·0	41·7	51·3	51·0	1·81
May	60·2	42·1	51·1	55·1	1·35
June . . .	67·5	50·4	58·9	60·6	2·77
July	72·5	54·4	63·4	65·5	3·29
August . . .	68·8	52·6	60·7	62·2	2·37
September .	62·4	47·1	54·7	57·4	1·80
October . .	55·8	45·1	50·4	51·1	3·26
November . .	51·3	41·5	46·4	46·3	4·76
December . .	45·5	36·6	41·0	41·8	1·95
Year . . .	—	—	50·1	51·3	27·92

1895.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	36·9	28·8	32·8	34·1	2·40
February . .	34·3	22·7	28·5	32·2	·16
March . . .	49·9	34·9	42·4	42·0	1·34
April . . .	56·7	41·2	48·9	50·5	1·62
May	67·6	46·0	56·8	59·2	·18
June . . .	73·1	50·9	62·0	65·0	·72
July	72·2	54·3	63·2	64·7	3·55
August . . .	72·0	53·8	62·9	64·1	2·40
September .	71·9	50·5	61·2	61·8	·64
October . .	53·8	39·7	46·7	49·4	2·78
November . .	51·8	41·1	46·4	45·2	4·17
December . .	43·6	34·5	39·0	39·5	1·92
Year . . .	—	—	49·2	50·6	21·88

1896.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	45·2	36·1	40·6	41·3	·60
February . .	45·9	33·8	39·8	41·2	·29
March . . .	53·1	39·1	46·1	46·2	2·34
April . . .	58·4	41·8	50·1	51·7	·56
May. . . .	65·5	44·9	55·2	59·0	·19
June . . .	74·4	53·9	64·1	66·6	2·40
July. . . .	75·5	54·1	64·8	63·0	1·43
August . . .	69·7	51·4	60·5	62·6	2·28
September .	64·8	50·9	57·8	58·6	5·51
October . .	52·6	39·7	46·1	47·9	2·66
November. .	45·1	34·2	39·6	40·7	·73
December. .	43·8	34·3	39·0	39·5	2·98
Year . . .	—	—	50·3	51·5	21·97

1897.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	39·0	31·8	35·4	36·7	1·67
February . .	48·1	39·6	43·8	42·5	2·29
March . . .	51·8	39·0	45·4	45·0	2·44
April . . .	54·8	39·5	47·1	48·5	2·61
May. . . .	62·4	43·3	52·8	56·4	·67
June. . . .	71·9	53·4	62·6	64·1	2·67
July	75·1	55·2	65·1	67·1	1·76
August . . .	72·8	54·3	63·5	65·5	3·41
September .	63·7	48·2	55·9	57·0	2·35
October . .	58·3	43·0	50·6	52·3	1·32
November. .	51·3	39·5	45·4	45·8	2·06
December. .	45·5	34·2	39·8	39·0	2·28
Year . . .	—	—	50·6	51·3	25·53

1898.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	47·9	39·1	43·5	43·0	·51
February . .	47·2	35·2	41·2	41·0	1·25
March . . .	47·6	33·4	40·5	41·0	·74
April . . .	58·0	38·7	48·3	51·0	1·11
May	61·4	44·5	52·9	54·0	2·40
June . . .	68·4	47·9	58·1	61·8	1·50
July	73·4	52·5	62·8	65·7	·47
August . . .	75·0	54·9	64·9	64·9	1·61
September .	72·3	49·8	61·1	61·5	·34
October . .	59·5	46·6	53·0	53·3	4·33
November . .	51·0	39·8	45·4	46·5	1·93
December . .	50·0	39·7	44·8	43·9	2·08
Year . . .	—	—	49·7	52·2	18·27

1899.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	47·2	35·9	41·5	40·1	2·70
February . .	48·7	34·0	41·3	41·1	1·82
March . . .	51·0	31·8	41·4	42·1	·25
April . . .	57·1	40·5	48·8	50·1	1·83
May	60·7	42·7	51·7	56·6	1·18
June . . .	72·0	50·1	61·0	65·3	·47
July	77·6	56·3	66·9	67·2	1·66
August . . .	78·8	53·3	66·3	67·7	2·83
September .	68·1	59·3	58·7	59·4	2·15
October . .	56·6	40·0	48·3	48·4	2·91
November . .	53·2	40·4	46·8	46·4	2·44
December . .	41·3	30·0	35·6	36·6	1·21
Year . . .	—	—	51·2	51·7	21·45

1900.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	45·6	34·3	39·9	39·4	2·20
February . .	43·2	31·5	37·3	36·3	4·46
March . . .	45·3	33·0	39·1	41·0	·47
April . . .	57·7	38·6	48·1	50·5	·80
May	62·9	43·0	52·9	55·8	1·18
June . . .	71·5	50·6	61·0	63·1	2·30
July	78·8	56·0	67·4	68·3	·75
August . . .	71·5	52·5	62·0	63·2	3·27
September .	69·1	46·9	58·0	58·8	·52
October . .	58·5	42·8	50·7	52·2	2·18
November . .	51·5	40·3	45·9	41·0	1·92
December . .	50·1	39·2	44·6	44·2	3·23
Year . . .	—	—	50·5	51·3	23·28

1901.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	43·1	32·2	37·6	38·2	1·06
February . .	41·2	30·9	36·0	36·4	·99
March . . .	46·7	33·5	40·0	41·0	1·56
April . . .	58·9	38·6	48·7	49·5	2·03
May	65·7	43·2	54·4	57·8	1·27
June . . .	71·1	48·9	60·0	63·0	·72
July	77·3	55·7	66·8	68·1	5·01
August . . .	72·9	52·1	62·5	61·8	1·77
September .	67·3	49·5	58·4	59·0	2·18
October . .	58·8	42·3	50·5	52·4	1·19
November . .	47·1	37·2	42·1	41·7	·41
December . .	43·0	32·1	37·5	36·8	3·24
Year . . .	—	—	48·7	50·4	21·43

1902.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	46·6	35·4	41·0	40·6	·66
February . .	40·6	30·3	35·2	34·2	1·13
March . . .	52·9	38·1	45·5	45·5	1·17
April . . .	56·9	37·6	46·9	48·9	1·15
May. . . .	58·8	41·3	50·0	53·2	1·69
June . . .	67·8	49·6	58·7	61·5	1·78
July	71·9	51·8	61·8	65·5	·72
August . . .	69·2	51·5	60·3	61·9	2·14
September .	65·2	45·2	55·1	58·2	1·43
October . .	57·0	43·6	50·3	50·5	1·66
November. .	50·0	38·7	44·3	44·2	2·14
December. .	44·9	38·5	40·7	40·6	1·36
Year. . .	—	—	49·1	50·4	17·03

1903.

Month.	Mean Maximum in Shade.	Mean Minimum in Shade.	Mean Air Temperature.	Mean River Temperature.	Total Rainfall in inches.
	°	°	°	°	
January . .	44·3	35·7	40·0	38·4	2·35
February . .	50·8	39·6	45·2	44·3	·80
March . . .	52·8	38·5	45·6	44·9	2·74
April . . .	53·2	36·1	44·6	46·9	2·11
May. . . .	63·1	44·6	53·8	55·3	4·21
June . . .	66·7	48·2	57·4	59·7	5·66
July	71·9	53·2	62·5	64·0	3·15
August . . .	68·0	50·8	59·4	60·7	3·80
September .	65·3	49·1	57·2	57·9	1·60
October . .	58·7	46·4	52·5	52·3	6·07
November. .	50·1	38·5	44·3	44·6	1·63
December. .	42·95	34·47	39·3	39·3	1·02
Year. . .	—	—	50·1	50·7	35·14

Mean Temperature of Cherwell for two Periods—I, of Ten Years, 1882–91, *and II, of Twelve Years,* 1892–1903.

Separately stated in columns I and II for purposes of comparison.

Month.	Mean Air Temperature for Day.		Mean River Temperature, 10 a.m.		Excess of River over Air Temperature.		Average Rainfall in inches.	
	I.	II.	I.	II.	I.	II.	I.	II.
	°	°	°	°	°	°	°	°
January . . .	37·6	38·4	37·8	38·4	0·2	·0	1·87	1·49
February. . .	38·6	39·2	39·5	39·3	0·9	·1	1·66	1·48
March. . . .	40·6	42·5	41·9	43·2	1·3	·7	1·48	1·27
April	45·9	48·5	48·3	50·7	2·4	2·2	1·80	1·37
May	53·1	53·8	55·4	56·9	2·3	3·1	2·05	1·35
June	59·6	60·5	61·6	63·2	2·0	2·7	2·17	1·95
July	62·3	64·2	64·6	65·7	2·3	1·5	2·58	2·33
August . . .	61·3	62·6	63·1	63·8	1·8	1·2	2·00	2·48
September . .	57·2	57·5	58·8	59·7	1·6	2·2	2·16	1·78
October . . .	48·9	49·7	50·0	50·9	1·1	1·2	2·41	2·83
November . .	43·1	44·3	43·4	44·3	0·3	·0	2·51	2·11
December . .	37·4	39·7	38·4	39·7	1·0	·2	1·86	1·98
Year . . .	48·9	50·0	50·3	51·3	1·4	1·3	24·79	20·92

Extreme Values of Monthly Means of River Temperature and Range between Warmest and Coldest Months of the same Name.

Month.	Maximum.	Minimum.	Range.	Date of Maximum.	Date of Minimum.	Air Warmer Occasions.
	°	°	°			
January . .	43·0	32·4	10·6	1898	1891	10
February .	44·3	32·2	12·1	1903	1895	9
March . .	46·8	38·3	8·5	1882	1888	4
April . . .	54·7	45·4	9·3	1893	1888	1
May . . .	63·0	51·3	11·7	1893	1884	1
June . . .	66·6	53·9	12·7	1896	1882	0
July . . .	68·7	61·0	7·7	1887	1888	1
August . .	67·7	60·7	7·0	1899	1903	1
September .	69·2	56·9	12·3	1893	1887	0
October . .	53·4	46·8	6·6	1893	1887	2
November .	46·8	40·7	6·1	1888	1896	10
December .	44·2	33·3	10·9	1900	1890	7
Year . .	53·5	49·0	4·5	1893	1888	46

APPENDIX B

Researches conducted in the Daubeny Laboratory in Recent Years, with References to the Journals in which the Researches have been published.

1888. December. The spectroscopic examination of the ash of a mould (*Aspergillus niger*) which had been watered with a weak solution of a zinc salt. It was found that a small quantity of zinc had been taken up by the plant. The investigation was carried out by Mr. Manley at the request of Dr. G. Buckmaster.

1891. Summer Vacation. Mr. Manley made a quantitative examination of a large number of juices from various plants for invert sugar. Professor Vines read a paper upon the subject at the Meeting of the British Association in the same year.

S. H. Vines, On the Presence of a Diastatic Ferment in Green Leaves, *Annals of Botany*, v. pp. 409–12, 1891, and *British Association Reports* for 1891, p. 697.

1893. March. Analyses of the embryo and endosperm of certain seeds (*Coix lachryma*) were performed by Messrs. Manley and Groom.

P. Groom, The Aleurone-layer of the Seed of Grasses, *Annals of Botany*, vol. vii. Sept. 1893.

1893. December. Messrs. V. H. Veley and Manley commenced an elaborate determination of certain of the physical constants of pure nitric acid. The experiments in connexion with this research were continued until the Christmas Vacation of 1900.

V. H. Veley and J. J. Manley, The Electric Conductivity of Nitric Acid, *Philosophical Transactions*, vol. 191, 1898.

1894. November. Mr. Manley made several nitrogen determinations in connexion with a research carried out by Miss O'Brien in Professor Vines's laboratory.

M. O'Brien, The Proteids of Wheat, *Annals of Botany*, ix. pp. 208–9, 1895.

1895–6. A series of experiments were commenced by Mr. Manley

in order to ascertain the rate of the change which starch solutions of definite strengths undergo when treated with specially prepared diastase in the presence of various salts. The work upon this subject is still incomplete.

1897. Mr. F. P. ARMITAGE brought to a successful conclusion a redetermination of the atomic weight of Boron by a method which had been attempted by the late Mr. HOSKYNS-ABRAHALL, a former demy of Magdalen College.

F. P. ARMITAGE, The Atomic Weight of Boron, *Proceedings of the Chemical Society*, xiv. pp. 22–3, 1898. The full MS. of this valuable work is preserved in the archives of the Chemical Society.

An examination of the absorptive power of volcanic tufa was made by Mr. GÜNTHER, and a chemical analysis of samples of the same rock was completed by Mr. MANLEY.

R. T. GÜNTHER, The Phlegraean Fields, *Geographical Journal*, Oct., Nov., 1897.

1898. Summer. Mr. MANLEY ascertained the values of certain physical constants of samples of faulty rum for Mr. Veley.

V. H. VELEY, Faulty Rum. Oxford University Press.

The specific gravity of a sample of water brought from the salt lake of Urmi in Persia by Mr. GÜNTHER was accurately determined by Mr. H. N. DICKSON, and the boiling-point, refractive index, and saline contents of the same water were measured by Mr. MANLEY.

R. T. GÜNTHER and J. J. MANLEY, On the Waters of the Salt Lake of Urmi, *Proc. Royal Society*, lxv. pp. 312–8, 1899.

Examination of part of the Collections made by Mr. GÜNTHER in Azerbaijan.

R. T. GÜNTHER, Reports on the Pliocene Mammalia, Crustacea, Neuroptera, and Diptera are published in Contributions to the Natural History of Lake Urmi, NW. Persia, and its Neighbourhood, *Journal Linnean Society*, xxvii. pp. 345–453.

1899. Summer Vacation. In order to ascertain whether the degree of salinity of a sea-water could be measured by an optical test with as close an approximation as by the specific gravity method, Mr. MANLEY examined some samples of sea-water obtained by Mr. DICKSON.

J. J. MANLEY, The Examination of Sea-Water by an Optical

Method, *Proc. Royal Society of Edinburgh*, pp. 35–43, Jan., 1900.

1899–1900. During the Long Vacations of these years, Mr. H. E. W. PHILLIPS commenced a piece of work on the electrical conductivity of phosphoric acid.

1900. During the early months of this year Mr. H. HILTON, Fellow of Magdalen, commenced some observations on Variable Stars with the $5\frac{1}{2}$ inch Cooke Refracting Telescope.

1901. Easter Vacation. In continuation of his work on sea-waters, Mr. MANLEY made determinations of certain of the physical constants of natural, diluted, and concentrated sea-waters.

J. J. MANLEY, The Electric Conductivities and Relative Densities of certain Samples of Sea-water, *Proc. Royal Society of Edinburgh*, xxiv. pp. 347–62, 1903.

Mr. GÜNTHER concluded the investigation of a medusa parasitic upon a pelagic mollusc from the Bay of Naples.

R. T. GÜNTHER, On the Structure and Affinities of Mnestra parasites, Krohn; with a Revision of the Classification of the Cladonemidae, *Mittheilungen aus der Zoologischen Station zu Neapel*, xvi. pp. 35–62, pls. 2 and 3, 1903.

V. H. VELEY and J. J. MANLEY, Ueber zwei einfache Methoden, Refractometerkreise zu calibriren, *Annalen der Physik*, [iv] vol. vi. pp. 575–9, 1901.

V. H. VELEY and J. J. MANLEY, Some physical properties of Nitric Acid Solutions, *Proc. Royal Society*, lxix. pp. 86–119, 1901.

V. H. VELEY and J. J. MANLEY, The Ionic and Thermal Coefficients of Nitric Acid, *Philosophical Magazine*, [vi] iii. pp. 118–22, 1902.

V. H. VELEY and J. J. MANLEY, Some physical and chemical properties of strong Nitric Acid, *Transactions of the Chemical Society*, lxxxiii. pp. 1015–21, 1903.

1902. R. T. GÜNTHER, Report on the Coelenterata from the Intermediate Waters of the North Atlantic, obtained by Mr. GEORGE MURRAY during the Cruise of the *Oceana* in 1898, *Ann. and Mag. Nat. Hist.*, ser. 7, xi. pp. 420–30, pls. ix and x, 1903.

R. T. GÜNTHER, Report on the Distribution of the Mid-water Chaetognatha in the North Atlantic, during the month of November, *Ann. and Mag. Nat. Hist.*, ser. 7, xii. pp. 334–7, pl. xxiv, 1903.

APPENDIX C

Additions to the Collection of Apparatus.

Since the death of Dr. Daubeny many additions have been made to the collections of instruments belonging to the Laboratory, additions rendered necessary by the ever-varying requirements of instruction and examination, as also by the continual development of science, and in some cases special apparatus have been acquired which was necessary for particular research work carried out in the Laboratory. A few specimens have also been added to the collections. Collections.

The chief acquisitions of apparatus, taken in chronological order, are:—

1867. Meteorological and Physical Instruments.

1869. Wrought-iron Digester tested to stand a steam pressure of 500 lb. to the square inch. (Presented to the Laboratory by Mr. Chapman.)

1872. Series of Anatomical Preparations in illustration of Professor Rolleston's *Forms of Animal Life*, which was prepared by Mr. Charles Robertson, formerly Demonstrator to the Linacre Professor. The preparation of the exoskeleton of the Lobster, which has been added to this series, was made by Mr. Chapman.

1874–6. Apparatus for Physiological Experiments.

Among the instruments purchased was an excellent Thomson's Reflecting Galvanometer by Elliott, which has been of the greatest use to us, and which has also been borrowed by Professor Gotch for use at the Museum; also a first-rate Long Beam Balance by Oertling, the possession of which enabled Mr. Armitage to perform his very accurate redetermination of the Atomic Weight of Boron.

1892. Physical Apparatus necessary for the performance of certain elementary physical experiments, a practical acquaintance with which had been required by the Board

of the Faculty of Natural Science from candidates in the Preliminary Physics examination.

1894. A Collection of Physical Apparatus purchased of Mr. H. G. Madan, of Queen's College.

1900. Apparatus for a Course of Instruction in Physical Chemistry under the supervision of Messrs. D. R. Wilson and J. J. Manley.

1903. An Electric Lantern by Kamm for the new Lecture Room.

Apparatus for the illustration of Mr. N. V. Sidgwick's Lectures on Organic Chemistry.

APPENDIX D

Bibliography.

The titles of the scientific and other writings of Charles Giles Bridle Daubeny, arranged in chronological order, together with the dates of the principal events of his life. With few exceptions all the published works enumerated are in the Library of Magdalen College.

1795. **Feb. 11. Born at Stratton, Gloucestershire.**

1808. **At Winchester School.**

1810. **July 26. Matriculated at Magdalen College.**

1814. **II Class, Literae Humaniores. B.A. June 1.**

1815. **Perrot Orator.**

Latin Essay. In Philosophia, quae Moralis dicitur, tractanda, quaenam sit praecipue Aristotelicae Disciplinae Virtus? pp. 1–54.

1815–8. **Medical Student at Edinburgh.** Attended Professor Jameson's Lectures on Geology and Mineralogy. His MS. lecture notes in 8vo, together with a 4to fair copy, are in the College Library.

1817. **M.A.**

1818. **B.Med.**

1819. **Tour in France,** described in letters to Professor Jameson.

1820–1. Letters on the Volcanos of Auvergne. *Jameson's Edinb. Phil. Journal. Reprinted* in 1825.

1820. Lecture given to the Society of Magdalen College in 1820 or thereabouts. (MS.)

1821. **D.Med.**

1822. **Oct. 10. Aldrichian Professor of Chemistry** (until 1854).

Nov. 2. Inaugural Lecture on the Study of Chemistry.

1823. pp. 1–57. Oxford, 1823. With an Appendix—Outline of a course of lectures on Chemistry to be delivered 1822–3, and an Address to the Bristol Literary and Philosophical Institution, On the Application of Chemistry to the Arts, delivered Jan. 6, 1823.

A fuller abstract was printed in Felix Farley's *Bristol Journal* for Saturday, Jan. 11. The MS. is preserved in the Library.

1825. Letters to Professor Jameson on the Volcanos of Auvergne, 1820–1. (*Reprint.*)

On Methods for separating Lime from Magnesia, 16 pp. *Edinb. Phil. Journ.* 1825.

Raffles, Necker, and Daubeny, C. Ueber die Vulkane auf Java, in den Auvergne und über den Monte Somma. *Elberfeld*, 1825.

1826. A description of Active and Extinct Volcanos. 8vo. London, 1826. (A 2nd edition appeared in 1848.)

Volcanic Geology. Article in *Encyclopaedia Metropolitana.*

1829. **Bursar of Magdalen College.**

May 15. On Iodine in certain Springs. Paper read to *Ashm. Soc.*

Nov. 27. On the Atomic Theory. Paper read to *Ashm. Soc.*

1830. On the discharge of Nitrogen Gas from various Warm Springs. *Bibl. Univ. Genève.*

(Substance of paper republished in the *Miscellanies*, 1867.)

A Sketch of the Geology of Sicily. *Jameson's Phil. Journ.* xiii. pp. 197 and 254, with geol. map.

Iodine and Bromine in Mineral Waters of S. Britain. *Phil. Trans.* cxx. Read May 6.

Vesuvius. Article in the *Edinburgh Encyclopaedia*, signed Δ.

1831. **Vice-President of Magdalen College.**

Introduction to the Atomic Theory. pp. 147 (Murray).

Mineral Waters. *London Review*, publ. by Bl. White.

On the Diluvial Theory and on the Origin of the Valleys in the Auvergne. *Edinb. New Phil. Journ.* April, pp. 1–29.

Nov. 11. On the New Volcanic Island in the Mediterranean from various communications. (*Ashm. Soc.*)

1832. Remarks on Thermal Springs and their connexion with Volcanos. *Edinb. Phil. Journ.* (cp. Delabeche's *Geological Manual*, 1833, p. 606).

Nov. 9. Sounds produced by Vibration of Heated Metals. (*Ashm. Soc.*)

Dec. 7. On Animal Magnetism. (*Ashm. Soc.*)

Reply to Professor Bischof's objections to the Chemical Theory of Volcanos. *Edinb. Phil. Journ.* No. 52, 8 pp.

1833. Remarks on a certain kind of Organic Matter formed in Sulphureous Springs. *Linn. Trans.* xvi. pp. 587–97. Read June 7.

Memoir on the degree of selection exercised by plants, with regard to the earthy constituents presented to their absorbing surface. *Linn. Trans.* xvii. Read Nov. 19.

Specimen of a proposed Index to the Oxfordshire Flora in Walker's *Flora of Oxfordshire*, 1833.

Feb. 22. On a specimen of decayed Wood and a Truffle from Van Diemen's Land. (Paper read to *Ashm. Soc.*)

May 3. On Daniell's Pyrometer. (Paper read to *Ashm. Soc.*)

On Wheatstone's Experiments on impressions of Light on the Eye. (Paper read to *Ashm. Soc.*)

June 1. On the Metamorphosis of Plants. (*Ashm. Soc.*)

June 7. On the slow conducting power of Volcanic Materials. (Paper read to *Ashm. Soc.*)

Nov. 1. On the Hot Springs at Bath, and on the Gas contained in the Waters. (*Ashm. Soc.*)

On Rutter's Method of using tar for fuel. (Paper read to *Ashm. Soc.*)

Nov. 29. On the Irritability of Plants. (Paper read to *Ashm. Soc.*)

On the evolution of Gas from Hot Springs. (Paper read to *Ashm. Soc.*)

On the level of the Caspian. (Paper read to *Ashm. Soc.*)

Dec. 7. Review of Nolan's Analogy of Revelation. *London Literary Gazette.*

Note on a Paper by Dr. John Davy, entitled 'Notice on the Remains of the recent Volcano in the Mediterranean.' *Phil. Trans.* cxxiii. p. 545.

1834. **Professor of Botany** and **Bursar.**

May 1. Inaugural Lecture, 39 pp.

[Superseded by an Essay on De Candolle printed in the *Miscellanies*, 1867.]

Report presented to the Visitors of the Oxford Botanical Garden.

On the Quantity and Quality of the Gases disengaged from the Thermal Spring which supplies the King's Bath in the

City of Bath. *Phil. Trans.* cxxiv. pp. 1–13. Read Dec. 19, 1833.

1835. Some account of the Eruption of Vesuvius which occurred in the month of August, 1834. *Phil. Trans.* clii. pp. 153–9.

Narrative of an Excursion to the Lake Amsanctus, and to Mount Vultur in Apulia in 1834. *Trans. Ashm. Soc.*

On the Volcanic Strata exposed by a section made on the site of the new Thermal Spring discovered near the Town of Torre dell' Annunziata in the Bay of Naples, with some Remarks. *Edinb. Phil. Journ.* Oct. 1835; *Proc. Geol. Soc.* ii. 1838.

Feb. 13. On the Combustion of Coal Tar (Second Communication). (*Ashm. Soc.*)

March 13. On the influence of Atmospheric Electricity on the Manufacture of Silk. (*Ashm. Soc.*)

March 17. Account of a recently discovered Spring in St. Clement's. (*Ashm. Soc.*)

On Mount Vesuvius and Volcanic Agency. (*Ashm. Soc.*)

On the recently discovered Buildings near Naples. (*Ashm. Soc.*)

June 12. On the Theory of Volcanos. (*Ashm. Soc.*)

On the Absorption of Plants. (*Ashm. Soc.*)

Nov. 6. On a Specimen of the Bromelia Pinguis. (*Ashm. Soc.*)

On two Springs evolving Nitrogen Gas. (*Ashm. Soc.*)

Nov. 20. On some Caverns near Cork. (*Ashm. Soc.*)

Dec. 4. Apparatus for collecting Gas from Volcanos. (*Ashm. Soc.*)

Expedition to Amsanctus and Mount Vultur. (*Ashm. Soc.*)

1836. On the action of Light upon Plants, and of Plants upon the Atmosphere. *Phil. Trans.* pp. 149–75. Read Dec. 17, 1835.

Reply to some remarks contained in Dr. J. Davy's Life of Sir H. Davy. *Lond. and Edinb. Phil. Mag. and Journ. of Sci.* March, 1836, pp. 249–54.

May 6. Davy Controversy. Reply to Objections against the Theory of Volcanos. (*Ashm. Soc.*)

Nov. 25. Observations on Thermal and Mineral Waters made in Germany, with Table of Springs evolving Nitrogen Gas. *Proc. Ashm. Soc.* Nov. 1836.

On the recent researches of Ehrenberg and the researches of Mitscherlich and Liebig. (*Ashm. Soc.*)

On the Observations of Quetelet and the Geographical Institute at Brussels. (*Ashm. Soc.*)

Extracts from a letter of Dr. Boué. (*Ashm. Soc.*)

1837. Report on the present state of our knowledge on Thermal and Mineral Waters. *Rep. Brit. Ass.* 1836. 95 pp.

Apr. 24. Description of the Rocks at Adersbach, Silesia. (*Ashm. Soc.*)

May 22. Instrument for obtaining Specimens of Water from considerable Depths. (*Ashm. Soc.*) *Trans. Soc. Arts*, lii. 1838.

1837–8. **Travels in United States of America.**

1838. On the Growth of Plants confined in Glass Vessels. *Rep. Brit. Ass.* vii. pp. 505–8.

Feb. 12. Letter on Meteorology of North America. (*Ashm. Soc.*)

Nov. 12. Exhibition of Zoological Specimens collected in America (list). (*Ashm. Soc.*)

Colonel Reid's Charts of Storms. (*Ashm. Soc.*)

Nov. 26. On the Specific Gravity and Saltness of the Sea at different Depths, with a Table showing the Quantity of Salt in Sea Water. *Proc. Ashm. Soc.* Nov. 26, 1838.

Sketch of the Geology of the United States and Canada. (*Ashm. Soc.*)

1839. Sketch of the Geology of North America. *Trans. Ashm. Soc.*

May 7. Exhibition of Photogenic Drawings. (*Ashm. Soc.*)

Composition of the Thermal Waters of Thermopylae. (*Ashm. Soc.*)

Recent views on the composition of Matter. (*Ashm. Soc.*)

May 28. Recent views on the composition of Matter (*continued*). (*Ashm. Soc.*)

Action of Organic Substances on Polarized Light. (*Ashm. Soc.*)

Nov. 18. New views on Fecundation and Development of Plants. (*Ashm. Soc.*)

1840. Syllabus of a Course of Lectures on Chemical Philosophy,

delivered at the Laboratory under the Museum, Oxford, 1840 (with MS. additions to 1844).

Supplement to an Introduction to the Atomic Theory, comprising a Sketch of certain Opinions and Discoveries bearing upon the General Principles of Chemical Philosophy, &c.

Feb. 17. Demonstration of Nobili's Rings and Electrotypes. (*Ashm. Soc.*)

June 1. Analysis of a Mineral Spring at Tenbury, Worcestershire. (*Ashm. Soc.*)

June 22. On Self-registering Meteorological Instruments. (*Ashm. Soc.*)

Dec. 7. Account of Works of Dr. Boué on Turkey in Europe. (*Ashm. Soc.*)

Professor of Rural Economy (until death).

July 22.
Nov. 25. } Three Lectures on Agriculture.
1841. Jan. 26.

On the Scientific Principles upon which the Application of Manures ought to be Regulated. *Journ. Royal Agric. Soc.* ii.

Feb. 15. Buntin's Barometer (travelling). (*Ashm. Soc.*)

March 15. On Spontaneous Combustion. (*Ashm. Soc.*)

May 24. On the Missouri Leviathan. (*Ashm. Soc.*)

June 7. On Sir D. Wilkie's Observations on the Barometer at the Dead Sea. (*Ashm. Soc.*)

Nov. 8. On Cheirostemon platanifolia. (*Ashm. Soc.*)

Dec. 6. Dolomite of Bolsover used for Houses of Parliament. (*Ashm. Soc.*)

1842. Lecture on the Application of Science to Agriculture.

On Public Institutions for the Advancement of Agriculture. *Journ. Royal Agric. Soc.* iii.

On the Chemical Constituents of Crops. *Journ. Royal Agric. Soc.* iii.

March 4. Daniell's New Patent Manure. (*Exhibit* to *Ashm. Soc.*)

May 30. Metal Magnesium. (*Exhibit* to *Ashm. Soc.*)

Nov. 28. Vegetable and Animal Life in Glaciers. (*Ashm. Soc.*)

1843. Sketch of Writings and Philosophical Character of A. P. de Candolle. *Proc. Ashm. Soc.* xx. p. 4. Read to *Ashm. Soc.* Feb. 13.

Travels in Spain with Captain Widdrington.

Feb. 24. Letter to Henslow, published in the *Bury Post.*

Nov. 6. On an Institution for the Cure of Cretinism. (*Ashm. Soc.*)

Journal of a Tour through the United States and Canada, made during the years 1837–8. pp. 239.

Tre lezioni sull' agricoltura.

Second Report of Committee on Growth and Vitality of Seeds.

1844. On the provisions for the Subsistence of Living Beings evinced in the structure of the Older Rocks, and in the phenomena which they exhibit. *Royal Inst.* May 31, 1844.

Lecture on Institutions for the better education of the Farming Classes; especially with reference to the proposed Agricultural College near Cirencester. (Murray), 29 pp.

March 11. } On Fluoric Acid from Recent and Fossil Bones (with
Nov. 18. } a Table of Analyses, p. 78). (*Ashm. Soc.*)

May 13. On the Natural History of Spain. (*Ashm. Soc.*)

1845. **June 25. Oratio ex Harveii Institutio.** 4to and 8vo.

On the occurrence of Fluorine in Recent as well as in Fossil Bones. *Quart. Journ. Chem. Soc.* pp. 97–104. Read March 18.

Memoir on the rotation of crops, and on the quantity of Inorganic Matter abstracted from the soil by various Plants under different circumstances. (Bakerian Lecture.) *Phil. Trans.* pp. 179–252.

On the occurrence of Phosphorite in Estremadura. Written with Captain Widdrington. Read to *Geol. Soc.* Feb. 17, 1844. Published in *Journ. Royal Agric. Soc.* v.; and in *Quart. Journ. Geol. Soc.* i. pp. 52–5.

Feb. 2. Guano deposited by Bats in Holton Church. (*Ashm. Soc.*)

May 5. Mummy wheat. (*Ashm. Soc.*)

1846. On the use of Spanish Phosphorite as a Manure (written Dec. 8, 1845). *Mem. Geol. Soc.* 1844; *Journ. Royal Agric. Soc.* vi.

May 11. On the Site of the ancient City of the Aurunci, and on the Volcanic Phenomena which it exhibits. *Trans. Ashm. Soc.*

On the Rationale of certain Manures employed in Agriculture, read to the Chemical Section of the *British Association,*

Sept. 11, 1846. (*Newspaper report in Agricultural Notes*, ii. p. 309. Magd. Library.)

On the distinction between the Dormant and Active Ingredients of the Soil. *Journ. Royal Agric. Soc.* vii.

Nov. 9. On Gun-cotton. (*Ashm. Soc.*)

1847. On the application of Chemical Principles to the Science of Geology. *Royal Inst.* March 24. (*Newspaper abstract in Notes to Science*, p. 401. Magd. Library.)

Bursar.

Feb. 22. Temperature of Geysers. (*Ashm. Soc.*)

Nov. 8. Various Observations. (*Ashm. Soc.*)

1848. **Laboratory erected.**

A description of Active and Extinct Volcanos, &c. (2nd edit.).

On the influence of Carbonic Acid Gas on the health of Plants, especially on those allied to the Fossil Remains found in the Coal Formation. *Rep. Brit. Ass.* pp. 1–23.

Brief remarks on the Correlation of the Natural Sciences.

March 6 and May 22. On Fossil Phosphate of Lime. (*Ashm. Soc.*)

March 6. Aneroid Barometer. (*Exhibit* to *Ashm. Soc.*)

June 5. Hybrid Cactus. (*Ashm. Soc.*)

Nov. 6. Fossil Fish. (*Ashm. Soc.*)

Nov. 20. Dangerous Effects of Bread without Ferment. (*Ashm. Soc.*)

1849. On the constitution of the Atmosphere. Delivered to City of Oxford, Dec. 6, 1849.

Feb. 26. New method of producing Light.

Oct. 29. Influence of Carbonic Acid Gas.

1850. Introduction to the Atomic Theory (2nd edit.).

Feb. 25. New views respecting Molecular Constitution of Matter. (*Ashm. Soc.*)

1851. On the Nomenclature of Organic Compounds. *Brit. Ass. Rep.* pp. 1–17, July 1.

Brief remarks on the Statute de Lectoribus publicis to be submitted to Convocation on Tuesday, June 17. (Vincent), pp. 1–12.

Die noch thätigen und erloschenen Vulkane.

Feb. 24. Sphaeria Robertsii. (*Ashm. Soc.*)

Aneroid Barometric Observations in Alps. (*Ashm. Soc.*)

Mineral Phosphate of Lime in United States. (*Ashm. Soc.*)

Boiler Incrustation. (*Ashm. Soc.*)

May 22. Lecture 'on the Principles of the Manufacture of Glass and Pottery,' in connexion with the visit of people to the Great Exhibition. (*Ashm. Soc.*)

Nov. 17. On Impression of Leaves of Vines, Grapes, and Seeds in Wood-coal. (*Ashm. Soc.*)

1852. A letter to the Members of Convocation on securing the collection of dried plants and works on Botany, presented by the late Mr. Fielding of Lancaster.

Notice of the Philosophical Character of Dr. Prout. *Ashm. Soc.*, Feb. 9.

Feb. 9 and March 8. Liebig's Method for Determination of Sugar in Urine. (*Ashm. Soc.*)

Feb. 23. Formation of Dolomites. (*Ashm. Soc.*)

Nov. 22. On Scandinavia. (*Ashm. Soc.*)

1853. Hints for enquiry suggested by a recent tour in Scandinavia. 8 pp.

Can Physical Science obtain a home in an English University? An enquiry suggested by some remarks contained in a late number of the *Quarterly Review*. pp. 1–26.

Two Articles on the School of Natural Science apropos of a letter to the *Oxford University Herald*.

On the Variation in the relative proportions of Potash and Soda present in certain samples of Barley grown in plots of ground artificially impregnated with one or other of these Alkalies. *Quart. Journ. Chem. Soc.* v.

Address delivered at the Anniversary Meeting of the Chemical Society, March 30. pp. 1–20.

Guide to the Oxford Botanic Garden, with an Address to the Members of the University.

Address to the Members of the University, May 20, 1853, on the completion of the arrangements for receiving the Fielding Herbarium in the room set apart for it within the Botanical Garden; with an Appendix.

Syllabus of Lectures on Inorganic Chemistry which will be delivered by the Professor of Chemistry in 1853–4.

Apr. 25. Effect of Magnet on Steel filings. (*Exhibit* to *Ashm. Soc.*)

Nov. 14. Map of Crater of Etna of Waltershausen. (*Exhibit* to *Ashm. Soc.*)

1854. **Resigned Chair of Chemistry.**

Nov. 13. On the causes of Cholera and other Epidemic Diseases. (*Ashm. Soc.*)

1855. On the influence of the Lower Vegetable Organisms in the production of Epidemic Diseases. *Edinb. New Phil. Journ.* July 11, n. s.

On the importance of the Study of Chemistry as a Branch of Education for all Classes. *Royal Inst.* p. 117.

Republished in Youman's *Modern Culture*, 1867.

On the influence of Light upon the Germination of Seeds. *Rep. Brit. Ass.*

On the produce obtained from Barley sown in Rocks of various ages. *Quart. Journ. Chem. Soc.* vii.

A Biographical Sketch of the Rev. Dr. Routh, late President of Magdalen College.

A Dream of the New Museum. pp. 1–14.

Preface to the Popular Geography of Plants by E. M. C.

June 11. Phosphoric Acid and Vegetable Life. (*Ashm. Soc.*)

Oct. 29. Analysis of Limestones from Connemara, Ireland. (*Ashm. Soc.*)

Nov. 26. Aluminium prepared from Cryolite. (*Exhibit* to *Ashm. Soc.*)

1856. An Address, as President, to the Members of the British Association at Cheltenham.

[A pamphlet on the *History of the British Association* was dedicated to Dr. Daubeny.]

1857. Lectures on Roman Industry.

Reasons for voting for Clauses 2 and 3 in the Examination Statute, relative to the attendance on the Lectures of Professors.

Sixteenth and Final Report on Growth and Vitality of Seeds.

March 16. Botanical MS. of Dioscorides. (*Exhibit* to *Ashm. Soc.*)

Nov. 23. Beetle Stones. (*Exhibit* to *Ashm. Soc.*)

Dec. 7. Remarks on Tsetse Fly. (*Ashm. Soc.*)

1858. On the evolution of Ammonia from Volcanos. *Proc. Geol. Soc.*

Additions to Book on Volcanos (? 1858).

1859. **Gave £140 as an endowment for the Daubeny Medal.**

1860. Remarks on the Final Causes of the Sexuality of Plants, with particular reference to Mr. Darwin's work on the *Origin of Species*. 34 pp., 1 plate.

On the Elevation Theory of Volcanos. *Brit. Ass.*

1861. A few words of apology for the late Prof. Baden Powell's Essay on the Study of the Evidences of Christianity contained in the volume entitled *Essays and Reviews*. By a Lay Graduate. 21 pp.

On the power ascribed to the Roots of Plants of rejecting Poisonous or Abnormal Substances presented to them (read May, 1861). *Quart. Journ. Chem. Soc.* xiv. 1862.

Supplementary note [to the above]. *Quart. Journ. Chem. Soc.* xv. 1862.

On the Physical Forces contained in the Phenomena of Vegetation, Lect. I, II. *Gardeners' Chron. and Agric. Gazette.* [A popular account of the papers on Potash and Barley, 1853, and Poison and Roots, 1861.] An abstract appeared in an Appendix to *Miscellanies*, 1867.

Catalogue of Philosophical Apparatus, Minerals, Geological Specimens, &c.

Reply to some Comments of Mr. F. Marcet on the Power of Selection ascribed to the Roots of Plants.

1863. Remarks on the Eruption of Vesuvius in December, 1861. *Edinb. Phil. Journ.* xvii. 1863. Read at British Association Meeting, Oct. 3, 1863.

Climate, an enquiry into the causes of its Differences, and into its influence on Vegetable Life (four lectures).

On the Vitality of Seeds. Lecture delivered at Oxford, 1863. (Suggestions by Professor Strickland concerning the above were published in the *Miscellanies*, 1867.)

On the supposed deterioration of the Soil of Great Britain through exhaustion of its Vegetable Mould. Lecture delivered before the Oxfordshire Farmers' Club, Nov. 11, 1863. *Gardeners' Chron.*

1864. Memoir on the Thermal Waters of Bath. *Rep. Brit. Ass.*

Comments on a new Declaration proposed for signature to Men of Science.

Decay of Species.

The New Examination Statute at Oxford. Letter to the *Times*, Feb. 22, 1864.

Three Letters on the Volcanos of Auvergne. [A Theological Controversy.]

Oct. 1. Newspaper controversy on Antiquity of Volcanos of Auvergne.

1865. Essays on the Trees and Shrubs of the Ancients; being the substance of four lectures supplementary to those on Roman Husbandry already published.

On the Celtic Remains of Brittany, Jan. 13, 1865.

Letter to the Provost of Oriel on University Extension.

Address as President of the Devonshire Association, Tiverton, Aug. 1865. 29 pp.

1866. ? Defence of the Volcanic Theory. *Quart. Journ. Sci.*

On the Antiquity of the Volcanos of the Auvergne. *Quart. Journ. Sci.* Apr. 1866, pp. 199–216.

Proportion of Graduates in Medicine at Oxford to the Population. *Rep. Brit. Ass.*, Nottingham, 1866.

Guide to Botanical Gardens. New edition.

On the Volcanic Region near Montbrison in Central France. *Proc. Ashm. Soc.* Nov. 12, 1866.

1867. On the Ignigenous Rocks near Montbrison. *Quart. Journ. Sci.* xiii. Jan. 1867.

On Ozone, and its Disengagement by the Leaves of Plants. *Quart. Journ. Chem. Soc.* xx. Jan. 1867.

Christianity and Rationalism. A Review of Lecky's History of the Rise and Influence of the Spirit of Rationalism in Europe, 1867. 26 pp.

May 20. Climate of the Ancient World. *Journ. Ashm. Soc.*

Miscellanies, being a Collection of Memoirs and Essays on Scientific and Literary Subjects, published at various times. 2 vols. 8vo.

Died December 12, 1867.

1868. Jan. 18. Will proved.

Feb. 17. Obituary note by Professor Phillips. *Proc. Ashm. Soc.* pp. 8–22.

1869. Fugitive Poems collected by the late C. Daubeny.

APPENDIX E

Register of Names of Persons who have attended the Lectures of Dr. Daubeny, and Courses of Instruction in the Daubeny Laboratory at Magdalen College.

CHEMICAL LECTURES.

Delivered in the Ashmolean Lecture Room, 1822–48.

1822–3. Howard, —.

Hewlett, Joseph Thomas James; Worcester, B.A. 1822.

Hawkins, George; Corpus Christi College, Scholar, 1817–24; Fellow, 1824–†6.

Calcott, John; Fellow of Lincoln, 1816; B.D. 1825; Proctor, 1824; Greek Lecturer.

Martyn, Thomas; Queen's, B.A. 1823.

Moore, E.

Watts, Rev. John; Fellow of University, 1817–29; Rector of Tarrant Gunville, Dorset, 1828–†72.

Ridley, Rev. Charles John; Fellow of University, 1813–54; Rawlinsonian Professor of Anglo-Saxon, 1822–7; Rector of West Harling, Norfolk, 1826–†54.

Morgan, Charles Octavius Swinnerton; Christ Church, B.A. 1825; M.P. Monmouthshire, 1841–74; F.R.S., F.S.A.; †1888. (*D.N.B.*)

Ireland, John James; 'chirurgus,' privilegiatus, 1827; Chorister, Christ Church, 1815–19.

Carey, Peter Stafford; St. John's, matriculated, 1821; Judge of Wells Borough Court, 1838–45; Bailiff of Guernsey, 1845; knighted, 1863; †1886.

Palmer, James Nelson; St. John's, B.A. 1825; Rector of Breamore, Hants, 1838–†64.

Bricknell, William Simcox; Worcester, B.A. 1827; Vicar and Patron of Eynsham, 1845.

Palmer, W.; St. Mary Hall, B.A. 1825; Professor of Civil Law, Gresham College; †1858. (*D.N.B.*)

Parker, Charles Hubert; Lincoln, B.A. 1822; Rector of Great Comberton, co. Worcester, 1826–†83.

Strickland, Nathaniel Constantine; Lincoln, B.A. 1829; Perpetual Curate, Bessingby, Yorks., 1835–83; †1886.

Thomas, George Fuller; Scholar of Worcester, 1819–26; Vicar of Butlers Marston, co. Warwick, 1846–†68.

Davenport, G. F.; of St. Giles', Oxford.

Jelf, Charles; Oriel, matriculated, 1824.

Pye, Henry Anthony; Demy of Magdalen, 1817–†23.

Wilson, G.

Cooke, Rev. George Leigh; Fellow of Corpus Christi College, 1800–15; Sedleian Professor of Natural Philosophy, 1810–†53. (*D.N.B.*)

Pusey, Edward Bouverie; Christ Church, B.A. 1822; Fellow of Oriel, 1823–9; Canon of Christ Church and Regius Professor of Hebrew, 1828–†82; Tractarian. (*D.N.B.*)

Majendie, Rev. George John; Fellow of Magdalen, 1820–39; Rector of Headington, 1839–†42.

Jenkins, Rev. Henry; Magdalen, Demy, 1803–27; Schoolmaster, 1812–29; Fellow, 1827–31; Rector of Stanway, Essex, 1830–†74.

Plumer, Charles John; Fellow of Oriel, 1821–30; Vicar of Ilford, Essex, 1868–82; †1887.

Ottley, John Bridges Hooker; Fellow of Oriel, 1822–5; Vicar of Thorpe Acre, co. Leicester, 1845–†79.

Brownlow, William; Pembroke, M.A. 1826; Rector of Wilmslow, Cheshire, 1829–72; †1876.

Wootten, John; Balliol, B.A. 1820; D.Med. 1826; †1847.

Wintle, Frederick Thomas; Radcliffe Infirmary, ?'chirurgus et pharm.,' privilegiatus, 1831; ?of the Warneford Asylum, Oxon.; D.Med.

Sheriffe, Thomas; Fellow of Magdalen, 1814–23; Proctor, 1822; Rector of Henstead, Suffolk, 1837–†61.

Cooke, Rev. Theophilus Leigh; Fellow of Magdalen; Perpetual Curate, Beckley, Oxon., 1803; †1846.

Duncan, John Shute; Fellow of New College, until 1829; Keeper, Ashmolean Museum, 1823–6; D.C.L. 1830; †1844. (*D.N.B.*)

1824–5. **Robinson, Richard Barton**; Queen's, B.A. 1826; Vicar of Lytham, 1834–70; †1872.

Jenkinson, John Simon; Magdalen Hall, B.A. 1827; Vicar of Battersea, Surrey, 1847–†71.

Bullock, James; Worcester, M.A. 1820.

Cole, William Sibthorpe; Worcester, M.A. 1822; Rural Dean of Selby, 1869–82 and 1884.

Hutchinson, Rev. Cyril George; Student of Christ Church, 1818–43; Honorary Canon of Gloucester, 1852; †1887.

Dodgson, Charles; Student of Christ Church, 1818–28; Archdeacon of Richmond, 1854–†68.

Wheeler, Daniel; St. Edmund Hall; B.A. 1826; ? †1887.

Welch, William; Queen Street, ? St. John's, matriculated, 1821; B.A. 1825.

Winterbottom, James Edward; St. John's, B.A. 1825; B.Med. 1833; F.R.G.S., F.L.S.; †1854.

Lace, Francis John; University, matriculated, 1822; B.C.L. 1832.

Symonds, John Addington; Magdalen College School; D.Med. Edinburgh, 'chirurgus et pharm.,' privilegiatus, 1831; staff appointments, Bristol Hospital; F.R.C.P. 1857; †1871. (*D.N.B.*)

Nicoll, Dr. Alexander; Canon of Christ Church; Regius Professor of Hebrew, 1822–†8; D.C.L.; Sub-Librarian, Bodleian Library. (*D.N.B.*)

Gresley, Richard Newcombe or **William** (*D.N.B.*); Students of Christ Church.

Thomas, Honoratus Leigh; Student of Christ Church, 1820–47; Rector of St. Tudye, Cornwall, 1846–†58.

Webber, George Henry; Student of Christ Church, 1820–7; Canon of Ripon, 1829–†58.

Herbert, I.

Oakeley, Frederick; Christ Church, B.A. 1824; Fellow of Balliol, 1827–45; seceded to Rome; Roman Catholic Canon of Westminster, 1852; †1880.

1826. **Matthews, Robert**; at Mr. Bull's, New Inn Lane.

Howard, William; Fellow of New College, 1823–37; Rector of Witchingham, Norfolk, 1836–†86.

Horndon, John; Exeter, M.A. 1827; †1864.

Prevost, Sir George, second **Baronet**; Oriel, B.A. 1825;

Tractarian; Archdeacon of Gloucester, 1865–81; †1893. (*D.N.B.*)

Woods, George Henry; Wadham, B.A. 1824; Treasurer of Chichester Cathedral, 1870–†9.

Vores, Thomas; Scholar of Wadham, 1823–30; Fellow, 1830–4; Vicar of St. Mary in the Castle, Hastings, 1841–†75.

Symons, Benjamin Parsons; Wadham, Fellow, 1812–31; Proctor, 1818; D.D. and Warden, 1831–71; Vice-Chancellor, 1844–8; †1878. (*D.N.B.*)

Nicholson, William; Trinity, B.A. 1829; Rector of Welford with Wickham, Berks., 1836–†78.

Freeman, Henry; Wadham, B.A. 1826; Rector of Folksworth, Hants, 1838–†64.

Walker, Robert; Wadham, B.A. 1822; Professor of Experimental Philosophy, 1839–†65; F.R.S.; Vicar of Culham, Oxon., 1848.

Clarke, William Thomas; Queen's, B.A. 1826.

Evans, Joseph Saville Roberts; Queen's, B.A. 1826; †1861.

Barber, Ambrose; Wadham, B.A. 1823.

Rhoades, James Peter; Scholar of Wadham, 1820–30; Fellow, 1830–2; Rector of Clonmel, Ireland, †1852.

Hammick, Stephen Love; Christ Church, M.A. 1829; D.Med. 1834; Radcliffe Travelling Fellow, 1837–†9.

Bishop, Charles Joseph; St. Mary Hall, M.A. 1823; D.Med. 1826.

Simcox, Edward George; Scholar of Wadham, 1819-27; J.P., co. Stafford; †1833.

Tufnell, Edward Carleton; Balliol, B.A. 1828; Student at Lincoln's Inn; †1886.

Wilson, Richard Bassett; University, B.A. 1829; †1867.

Mills, William; Fellow of Magdalen, 1820–34; Whyte's Professor of Moral Philosophy, 1829–†34.

Parsons, Frederick James; Demy of Magdalen, 1815–33; Fellow, 1833–42; Vicar of Selborne, Hants, 1842–†75.

Parsons, William; Magdalen, B.A. 1822; third **Earl of Rosse**; Hon. Fellow, 1862–7; President of the Royal Society, 1849–54; †1867. (*D.N.B.*)

Meredith, Charles John; Chaplain of Magdalen, 1823–6; Fellow of Lincoln, 1825–49; †1851.

Corfe, Joseph; Magdalen, B.A. 1827; Chaplain of Magdalen, 1832–6; Rector of St. Kerrian with St. Petrock, Diocese of Exeter, 1844–56; Rural Dean, 1851; †1878.

Greswell, Rev. William; Fellow of Balliol, 1818–38; Rector of Kilve, Somerset, 1837–†76.

Candy, Charles; Lincoln, M.A. 1824; Vicar of Shottermill, Surrey, 1850–84.

Philipps, William Thomas; Fellow of Magdalen, 1820–42; Keeper of the Ashmolean Museum, 1822–3; Rector of Fittleton, Wilts., 1840–†54.

Loveday, Rev. Thomas; Fellow of Magdalen, 1817–31; Rector of East Ilsley, Berks., 1831–6; †1873.

Plumptre, Rev. Frederick Charles; Fellow of University, 1817–36; Master, 1836–†70.

Walker, Rev. Richard; Fellow of Magdalen, 1821–52; Master, Magdalen College School, 1828–44; †1870.

Sale, Thomas; Demy of Magdalen, 1823–33; Fellow, 1833–4; D.D. 1856; Canon of York, 1871–†3.

Robertson, William; Demy of Magdalen, 1824–36; Fellow, 1836–†77; D.C.L. 1842; student of medicine.

Stone, William; Fellow of Brasenose, 1822–30; Canon of Canterbury, 1855; †1882.

Davies, Charles; Fellow of Pembroke, 1817–26.

Wall, Rev. Martin Sandys; Student of Christ Church, 1804–43; Chaplain to H.M.S. *Centaur*, 1812; Chaplain in Ordinary to the Prince Regent, and to the Embassy at Vienna, 1818; †1871.

Dymock, William George; Exeter, B.A. 1824; Rector of Hatch Beauchamp, 1839–†40.

Cobham, Jonathan Blenman; Oriel, B.A. 1823; Rector of Dingley, Northants, 1854–†76.

Girdlestone, Charles; Fellow of Balliol, 1818–26; Rector of Alderley, Cheshire, 1837–47; and of Kingswinford, 1847–77; †1881. (*D.N.B.*)

Smith, Spencer; Balliol, B.A. 1827; †1882.

Butcher, Mark Grigson; Brasenose, B.A. 1826.

Denison, George Anthony; Fellow of Oriel, 1828–39; Tractarian; Prebendary of Wells and Archdeacon of Taunton, 1851; †1896. (*D.N.B.*)

Parker, —.

Mallam, —; with Mr. Cleoburey (? 'chirurgus,' privilegiatus, 1814).

Churton, Rev. William Ralph; Chancellor's prize for Latin Verse, 1820; Fellow of Oriel, 1824–†8. (*D. N. B.*)

Grantham, George; Fellow of Magdalen, 1809–40; Vicar of Waith, co. Lincoln, 1820–†40.

West, C.; with Mr. Tuckwell.

Egerton, Sir Philip de Malpas, Bart.; Christ Church, B.A. 1828; F.R.S. 1831; M.P., Divisions of Cheshire, 1835–†81. (*D. N. B.*)

1826–7. Browne, E.; with Mr. Hichens.

Haverfield, Thomas Tunstall; Fellow of Corpus Christi College, 1812–27; Rector of Godington, Oxon., 1826–†66.

Beynon, Rev. David; Jesus, B.D. 1823.

Phillips, Philip Lovell; Exeter, B.A. 1826; D.Med. 1833.

Bramston, John; Oriel; Fellow of Exeter, 1825–30; Dean of Winchester, 1872–†83.

Brown, Joseph John Alfonso; University, B.A. 1830; D.Med. 1842.

Stroud, Joseph; Wadham, M.A. 1826; Rector of Bondleigh, Devon, 1854–†5.

Sankey, Rev. Richard; Scholar of Corpus Christi College, 1820–8; Fellow, 1828–9; Rector of Witney, Oxon., 1853–†63.

Hawkins, Ernest; Balliol, B.A. 1824; Fellow of Exeter, 1831–52; Secretary of the S.P.G.; Minister of Curzon Chapel, Mayfair, 1850–†68; Canon of Westminster, 1864. (*D. N. B.*)

Thomas, William Beach; Scholar of Pembroke, 1820–9; Fellow, 1829–31; Rector of Johnston with Steynton, co. Pembroke, 1846–†76.

Evans, Henry Herbert; Magdalen Hall, B.A. 1832; Incumbent of Leytonstone, Essex, †1863.

Lamotte, John Lewis; Wadham, B.A. 1826.

Bourne, John Gervas Hutchinson; Magdalen, M.A. 1828; Barrister-at-Law, Inner Temple, 1829–†45.

White, Robert Meadows; Fellow of Magdalen, 1824–47; Rawlinsonian Professor of Anglo-Saxon, 1834–9; Rector of Slymbridge, co. Gloucester, 1846–†65. (*D. N. B.*)

Shaw, James; with Mr. Wingfield (? Charles, 'chirurgus,' privilegiatus, 1816).

Parker, Charles Lewis; Wadham, B.A. 1831.

Garbett, James; Fellow of Brasenose, 1825–36; Rector of Clayton-cum-Keymer, Sussex, 1835–†79; Professor of Poetry, 1842–52. (*D.N.B.*)

Greswell, Francis Hague; Fellow of Brasenose, 1827–30.

Wilberforce, Robert Isaac; Fellow of Oriel, 1826–33; Archdeacon of the E. Riding of Yorkshire, 1841, until he seceded to Rome, 1854; †1857.

Farquharson, James John; Christ Church, B.A. 1828; J.P., D.L., High Sheriff, Dorset, 1879.

Wiggin, Benjamin Holme; Corpus Christi College, matriculated, 1826; assumed name of **Mowbray** by royal licence in 1835.

Butler, Charles Robert; Worcester, B.A. 1827; Vicar of Newchurch, I.W., 1870–†8.

Pocock, Sir Charles Samuel, Bart.; Christ Church, B.A. 1826; Rector of Rous Lench, co. Worcester, 1838–†81.

Botfield, Beriah; Christ Church, B.A. 1828; M.P. for Ludlow, 1840–7, 1857–†63. (*D.N.B.*)

Newnham, George William; Scholar of Corpus Christi College, 1823–31; Fellow, 1831–3; Perpetual Curate of Combe Down, Bath, 1842–77.

Guppy, Robert; Pembroke, B.A. 1828; Barrister-at-Law, Middle Temple, 1831.

Huston, T. L.

Short, Rev. Augustus; Christ Church, B.A. 1823; Bampton Lecturer, 1846; D.D. 1847; First Bishop of Adelaide, 1847–81; †1883. (*D.N.B.*)

Biscoe, Robert; Christ Church, M.A. 1825; Prebendary of Hereford, 1834; †1870.

Hawkins, Robert; Pembroke, Exhibitioner, 1823–35; Vicar of Lamberhurst, Sussex, 1834.

Riggs, George; Scholar of Queen's, 1820–36; Fellow, 1836–46; Rector of Charlton-on-Otmoor, Oxon., 1846–†55.

Partington, Henry; Student of Christ Church, 1826–34; Vicar of Wath-on-Dearne, 1833.

Hill, Edward; Student of Christ Church, 1827–50; Rector of Shering, Essex, 1845; Hon. Canon of St. Albans, 1872.

Wells, Charles; Fellow of New College, 1825–†34; Curate of Beeding, Sussex.

Bussell, John Garrett; Trinity, B.A. 1829; Prebendary of Lincoln Cathedral, 1859; †1874.

Le Mesurier, Henry; Fellow of New College, 1824–32; Master at Bedford Grammar School; †1874.

Bourne, Digby Michael; Worcester, B.A. 1827.

Earle, Charles Hare; Trinity, M.A. 1827; †1839.

The Junior Proctor, probably the **Rev. Andrew Edwards**, cf. p. 73.

Dawson, D.; Rev. Mr. Hinton's, Brewer's Lane.

King, Charles; Magdalen, Chorister; B.A. 1831; Perpetual Curate of Stratford-sub-Castle, Wilts., 1852–†85.

Gower, John Alexander; Magdalen, B.A. 1826; Chorister, 1810–20; Chaplain, 1827–32; Master of the Hospital, Stoke Pogis, Bucks.

Grantham, Thomas; Fellow of Magdalen, 1813–31; Rector of Bramber-cum-Botolphs, Sussex, 1830–64.

Simmons, —; with Mr. Hagley (? Edward, the 'pharmacopola,' privilegiatus, 1814).

1828. **Bragge, W.**; New College, M.A.

Martin, Richard; Fellow of Exeter, 1824–31; Vicar of Menheniot, Cornwall, 1831–83; Canon of Truro; †1888.

Gray, George Francis; Fellow of University, 1814–53; †1854.

Froude, William; Oriel, matriculated, 1828; M.A. 1837; Naval architect and mathematician; F.R.S.; †1879. (*D.N.B.*)

Hornby, Robert (Vernon) Atherton; Oriel, B.A. 1828; †1857.

Whately, Rev. Dr. Richard; Principal of St. Alban Hall, 1825–31; Fellow of Oriel, 1811–22; Archbishop of Dublin, 1831–†63. (*D.N.B.*)

Burrows, Rev. Joseph; Brasenose, B.D. 1817; Rector of Steeple Aston, Oxon.

Cornthwaite, Tullie; Trinity, B.A. 1828 (Orders).

Sewell, Henry Doyle; Trinity, B.A. 1828; Vicar of Headcorn, Kent, 1850–†86.

Cox, George; Magdalen Hall, B.A. 1828.

? **Hickes, Fowler**; Brasenose, M.A. 1819 (?); †1838.

Cardwell, Henry Salisbury; Brasenose, B.A. 1824; †1833.

Watson, John, Fellow of Brasenose, 1813–32; †1875.

Harington, Richard; Fellow of Brasenose, 1822–34; Principal, 1842–†53.

Higgins, Edward; Brasenose, Scholar, 1822–5; †1884.

Wilson, John; Fellow of Trinity, 1816–50; President, 1850–66; F.S.A., F.R.S.; †1873.

Hume, Charles John; Fellow of Wadham, 1824–30; Rector of Meonstoke, Hants, 1832.

Grenfell, Algernon; Chorister, Magdalen, 1817–20; University, Scholar, 1824–9; Master at Rugby, 1831–†45.

Saunders, Thomas Bush; Wadham, B.A. 1828; Barrister-at-Law, Lincoln's Inn, 1831; J.P. Wilts.

Round, James Thomas; Fellow of Balliol, 1820–35; Rector of Colchester, 1851–†60.

Copleston, William James; Fellow of Oriel, 1826–40; Rector of Cromhall, co. Gloucester, 1839–†74.

Smith, Edward Parris; Pembroke, B.A. 1828; M.A. 1840.

Glaister, William; Fellow of University, 1821–38; Rector of Beckley, Sussex, 1837–†61.

Falconer, William; Fellow of Exeter, 1827–39; Rector of Bushey, Herts, 1839–†85.

Bull, Henry; Christ Church, B.A. 1819; Honorary Canon, 1877; Under Master of Westminster, 1821–28; Vicar of St. Mary Magdalen, Oxford, 1834; Vicar of Lathbury, Bucks, 1838–†88.

Edwards, Rev. Andrew; Fellow of Magdalen, 1823–†72; D.D.; Proctor, 1827.

1829. Lent **Hussey, Robert**; Student of Christ Church, 1821–46; First Regius Professor of Ecclesiastical History, 1842–†56. (*D.N.B.*)

Lefroy, Charles Edward; Christ Church, B.A. 1832; Secretary to the Speaker, and Taxing Officer of House of Commons; †1861.

Greswell, Rev. Richard; Fellow of Worcester, 1824–37;

Honorary Fellow, 1878–†81; one of the founders of the Museum and of the Ashmolean Society. (*D. N. B.*)

Froude, Robert Hurrell; Oriel, B.A. 1826; Tractarian; †1835. (*D. N. B.*)

Buller, Anthony; Oriel, B.A. 1831; Rector of Tavy St. Mary, Devon, 1833–76; †1881.

Bailey, Joseph; Brasenose, B.A. 1832; M.P. Herefordshire, 1841–†50.

Vaughan, Henry; Scholar of Worcester, 1826–32; Vicar of Crickhowel, Brecon, 1832; †1837.

Heberden, Rev. William; Fellow of Exeter, 1828–30; Vicar of Broadhembury, Devon, 1830–74.

Selkirk, Douglas Dunbar James, sixth **Earl of**; Christ Church; Keeper of the Great Seal of Scotland, 1852, 1858; F.R.S.; †1885.

Powell, Alexander; Exeter, matriculated, 1827; †1882.

Bennet, Charles, Lord Ossulston, sixth **Earl of Tankerville**; Christ Church, B.A. 1831.

Blencowe, Edward; Wadham, B.A. 1828.

1829. **Ryder, George Dudley**; Oriel, B.A. 1833; †1880.

Mich. **Wilson, John**; Fellow of Queen's, 1815–36; Classical Examiner, 1826–7; Rector of Holwell, Dorset, 1835–†57.

Palairet, Charles; Michel Exhibitioner of Queen's, 1822–4; Scholar, 1824–7; I Cl. 1825; Fellow, 1827–39; Orders.

Mozley, Thomas; Fellow of Oriel, 1829–37; Perpetual Curate of Plymtree, Devon, 1868–80; †1893. (*D. N. B.*)

Carew, William Henry Pole-; Oriel, B.A. 1833; M.P., East Cornwall, 1845–52.

Mallock, William; Balliol, B.A. 1831; Rector of Cheriton Bishop, 1844.

Powell, Baden; Oriel, M.A. 1820; Savilian Professor of Geometry, 1827–60; F.R.S. 1824; F.R.A.S., F.R.G.S.; Vicar of Plumstead, 1822–7; †1860. (*D. N. B.*)

Powell, Henry; Exeter, B.A. 1831; D.Med. 1839.

1830. **Fursdon, Edward**; Oriel, B.A. 1833; Vicar of Dawlish, 1846–64.

Marriott, John; Oriel, B.A. 1830; Vicar of Hythe St. John's, 1863–78; †1881.

Young, Newton Barton; Fellow of New College, 1827–52; Rector of Tilbrook, Northants, 1855.

Johnson, William Wilbraham; Brasenose, B.A. 1829; Minor Canon of Manchester Cathedral; †1864.

Pusey, William Bouverie; Oriel, B.A. 1831; Rector of Langley, Kent, 1842–†88.

Gilbert, John Davies; Pembroke, matriculated, 1829; of Eastbourne, Sussex; †1854.

Powell, James Cotton; Trinity, B.A. 1831; Student at Lincoln's Inn; Curate of St. James, Clapton, Middlesex; †1851.

Chapman, John Mitchell; Fellow of Balliol, 1824–38; Rector of Tendring, 1838–†78.

Madan, George; Student of Christ Church, 1829–37; †Rector of Dursley.

Karslake, William Heberden; Oriel, B.A. 1830; Rector of Meshaw and Creacombe, Devon, 1832–†78.

Jordan, C.

Churton, Henry Burgess Whitaker; Balliol, Fellow of Brasenose, 1833–43; Vicar of Icklesham, Sussex, 1844.

Feild, Samuel Hands; Worcester; B.A. 1830; Curate of St. Michael, North Kensington, 1884–†86.

Symons,—; late of the Infirmary.

Marriott, Charles; Scholar of Balliol, 1829–33; Fellow of Oriel, 1833–58; Tractarian; Vicar of St. Mary the Virgin, Oxford, 1850–†58. (*D. N. B.* and Burgon's *Lives.*)

Tawney, Richard; Fellow of Magdalen, 1824–35; Rector of Willoughby, co. Warwick, 1835–†48.

1831. **Burningham, Thomas**; Trinity, B.A. 1830; Rector of Charlwood, Sussex, 1855–83.

Belfield, John Finney; Oriel, B.A. 1834; J.P., Devon.

Pierrepont, Henry Bennett; New College, B.A. 1833.

Owen, Rev. Owen; Fellow of Jesus, 1822–31; lost in the *Rothsay Castle* near Beaumaris in this year 1831.

Williams, Rev. Charles; Fellow of Jesus, 1829–45; D.D.; Principal, 1857–†77.

Carwithen, George William Terry; Oriel, B.A. 1832; Rector and Patron of Ashprington, Devon, 1859.

Morris, Robert; Christ Church, M.A. 1833; Rector of Fryern-Barnet, 1850–82.

Shirley, Evelyn Philip; Magdalen, B.A. 1834; M.P., South Warwickshire, 1853–65; †1882.

Hutchinson, William; All Souls, Bible Clerk, 1828–33; Vicar of Blurton, co. Stafford, 1865.

Dix, Joshua; All Souls, B.A. 1833; Rector of All Hallows', Bread St., London, 1851–†71.

Ward, William Craig; Bible Clerk of All Souls, 1830–3; Curate of East Tuddenham, 1848–†79.

Buller, William Charles; matriculated at Oriel, 1830; B.A. 1835; Fellow of Exeter, 1836, vacated 1851 by not taking the Degree of B.D.; barrister, 1840; †1875.

Goodson, Thomas; Worcester, B.A. 1831; of Lincoln's Inn, 1833.

Ley, Jacob; Student of Christ Church, 1822–59; Vicar of Staverton, Northants, 1858–†81.

Williams, Rev. John; Student of Christ Church, 1816–42; Vicar of Spelsbury, Oxon., 1841; †1873.

Twiss, Travers; Scholar of University, 1827–30; D.C.L. 1841; F.R.S. 1838; Regius Professor of Civil Law, 1855–70; Chancellor of Diocese of London, 1858–72; knighted, 1867; †1897. (*D.N.B.*)

Twisleton, Edward Turner Boyd; Fellow of Balliol, 1830–8; Honorary Student of Christ Church, 1867–74; Civil Service Commissioner, 1862–70; †1874. (*D.N.B.*)

1831. Falkner, R.

Oct. **Jeffrays, Lockhart William**; Balliol, B.A. 1834; Rector of Aldford, Cheshire, 1853–†62.

Rushout, George; Christ Church, B.A. 1833; third **Lord Northwick**; M.P., Evesham; †1887.

Head, Sir Edmund Walker, Bart.; Fellow of Merton, 1830–9; Governor-General of Canada, 1854–61; F.R.S.; K.C.B.; †1868. (*D.N.B.*)

Villiers, Edward Ernest; Fellow of Merton, 1831–6; Commissioner for the Colonization of South Australia; †1843.

Trevelyan, George; Fellow of Merton, 1826–35; Vicar of Malden with Chessington, Surrey, 1834–†50.

Morris, John Brande; Balliol, B.A. 1834; Fellow of Exeter, 1837–46; seceded to Rome; †1880. (*D.N.B.*)

Smith, Bernard; Demy of Magdalen, 1831–6; Fellow, 1836–9; seceded to Rome, 1842; Canon of Northampton, 1858; †1903.

Bayley, —; Abingdon.

Macbride, John David; Principal of Magdalen Hall, 1813–†68; Fellow of Exeter, 1800–5; D.C.L. 1811; Lord Almoner's Professor of Arabic. (*D.N.B.*)

Simcox, Thomas Green; Wadham, B.A. 1831; Vicar of North Harborne, 1838–71; †1876.

Watts, William; Scholar of University, 1829–34; Perpetual Curate, St. Giles-in-the-Fields, 1845–†7.

Jones, William (Bence-); Balliol, B.A. 1834; Barrister-at-Law, Inner Temple, 1857.

Lushington, William Hurdis; Oriel, B.A. 1832; Rector of Eastling, Kent, 1836–†42.

Carter, Thomas Thellusson; Christ Church, B.A. 1831; Tractarian; Warden of the House of Mercy, Clewer, 1849; Honorary Canon of Christ Church, 1870; †1901.

Woodcock, Charles; Student of Christ Church, 1828–35; Vicar of Chardstock, 1833–75.

Govett, Robert; Fellow of Worcester, 1835–44.

Hotham, John Hallett; Magdalen, Demy, 1831–6; Vicar of Sutton-at-Hone, 1836–80; †1901.

Joy, John H.; Trinity College, Dublin.

LECTURES ON VEGETABLE CHEMISTRY AND PHYSIOLOGY.

1832. **Le Mesurier, Henry**; Fellow of New College, 1824–32; Master at Bedford Grammar School; †1874.

Bridges, Thomas Edward; President of Corpus Christi College, 1823–†43.

Grantham, Rev. George; Magdalen, Demy and Fellow, 1798–†1840.

Erle, Christopher; Fellow of New College, 1815–34; Rector of Hardwicke, Berks., 1833–70.

Wall, Henry Edward; Fellow of New College, 1830–†7.

LECTURES ON CHEMISTRY.

1832. Oct. **Bevan, David Barclay**; University, B.A. 1836; Vicar of Little Amwell, Herts, 1864–81.

Fisher, Cuthbert Jeddere; Wadham, B.A. 1836.

Coley, Richard Mallet; Queen's, B.A. 1839; B.Med. 1840.

Courthope, George Campion; Christ Church, B.A. 1833; J.P., D.L.; High Sheriff, Sussex, 1850; †

Eden, Charles Page; Fellow of Oriel, 1832–51; Vicar of St. Mary the Virgin, Oxford, 1843–50; of Aberford, 1850–†85. (*D.N.B.*)

Vandeleur, Henry Seymour Moore; Worcester, matriculated, 1831; †1875.

Weare, Thomas William; Student of Christ Church, 1832–53; B.A. 1836; Under Master of Westminster, 1841–61; Rector of Isfield, Sussex, 1867–†71.

Wingfield, William Frederick; Christ Church, B.A. 1836.

Morgan, William; Fellow of Magdalen, 1821–54; †1881.

Pattison, Mark; Oriel, B.A. 1836; Fellow of Lincoln, 1839–60; Rector, 1861–†84. (*D.N.B.*)

Blackall, Henry; Christ Church, B.A. 1832.

Hunter, William Percival; Merton, matriculated, 1832; of the Inner Temple, 1836.

LECTURES ON VEGETABLE CHEMISTRY.

1833. **Dawson, Charles Thomas**; Balliol, B.A. 1829; †1842.

Lent **Jenkyns, Rev. Henry**; Fellow of Oriel, 1818–35; Professor of Greek at Durham, 1833; Canon of Durham, 1839–†78.

Grey, Rev. George Francis; Fellow of University, 1814–53; †1854.

Black, Patrick; Christ Church, B.A. 1835; D.Med. 1844; Physician, St. Bartholomew's Hospital; †1879. (*D.N.B.*)

Hughes, Rev. James Henry; Magdalen, Demy, 1825–9; Fellow, 1829–35; Vicar of Barrow-upon-Trent, 1871–†80.

Parigot, J.; Alfred Street. Graduate in Mathematics, University of Ghent; Professor of Geology and Mineralogy at the Free University of Belgium.

Stevens, Thomas; Oriel, B.A. 1832; Founder and Warden of St. Andrew's College, Bradfield, 1847–81; †1888.

Syres, O. B. [? spelling].

CHEMICAL LECTURES.

1834. **Buckle, Henry**; with Mr. Rusher (? a son of William

Lent Buckle, the 'apothecarius et parturientibus opem ferens,' privilegiatus, 1821).

Bayley, William Harley; Christ Church, B.A. 1835; of Lincoln's Inn, 1834.

Stevens, C.; with Mr. Rusher.

Whipham, Theodore William; Balliol, B.A. 1837; Barrister-at-Law, Inner Temple, 1846; †1858.

Stephenson, Christopher Gurdon; Queen's, B.A. 1835.

Dale, Henry; Magdalen, B.A. 1834; Rector of Wilby, Northants, 1853; †.

Chaplin, Edward John; Fellow of Magdalen, 1836–52; †in College, 1853.

Pickin, Francis William; Magdalen, Demy, 1833–43; Fellow, 1843–†6.

Dennis, John; Wadham, matriculated, 1833; B.A. 1837 (St. Mary Hall).

Stafford, James Charles; Fellow of Magdalen, 1832–42; Vicar of Dinton, Wilts, 1841–†73.

1835. **Davenport, S.**

Lent **Campion, Charles Heathcote**; Christ Church, B.A. 1836; Rector of Westmeston, Sussex, 1848; Prebendary of Chichester Cathedral, 1870; †1888.

Burgess, James Robert; Oriel, M.A. 1834; Vicar of Streatley, Berks.

Ryder, William Dudley; Exeter, B.A. 1835; Arbitrator in the Mixed Court, New York.

Newington, Samuel; Worcester, matriculated, 1834; B.A. from New Inn Hall, 1842.

Cripps, Henry William; Fellow of New College, 1834–45; Recorder of Lichfield, 1852; Chancellor of Diocese of Oxford, 1883.

Tait, Archibald Campbell; Fellow of Balliol, 1834–42; F.R.S.; Head Master, Rugby School, 1842–50; Dean of Carlisle, 1850–6; Bishop of London, 1856–68; Archbishop of Canterbury, 1868–†82. (*D.N.B.*)

Courthope, William; Christ Church, B.A. 1838; Rector of Malling, Sussex.

Bright, William; Worcester, matriculated, 1832.

West, Reginald Windsor; Balliol, B.A. 1838; seventh **Earl Delawarr**; Chaplain in Ordinary to the Queen, 1846; assumed additional name **Sackville** in 1843; †1896.

Gillespie, David; Christ Church, matriculated, 1832; D.L. of Fife.

Woollcombe, William Wyatt; Fellow of Exeter, 1834–54; Rector of Wootton, Northants, 1854–82; †1886.

Huntingford, George William; Fellow of New College, 1833–50; Vicar of Littlemore, Oxon., 1851–72; Rector of Barnwell, Northants, 1872.

Lawes, John Bennet; Brasenose, matriculated, 1833; created a Baronet, 1882; F.R.S. 1854; gold medallist, 1867; D.C.L. 1892; Founder of the Rothamsted Agricultural Experiment Station; †1900. (*D.N.B.*)

1836. **Daubeny, George Barnston**; Balliol, B.A. 1835; †1869.

Thornton, Edward; Student of Christ Church, 1832–47; Barrister-at-Law, Lincoln's Inn, 1840.

Drummond, George (Stirling) Home; Christ Church, B.A. 1836; †1876.

Courtenay, Hon. Charles Leslie; Christ Church, B.A. 1837; Domestic Chaplain to Queen Victoria, 1843–9; Canon of Windsor, 1859.

Welch, James; Queen's College, matriculated, 1836; M.A. 1843; Barrister-at-Law, Inner Temple, 1844.

Phillott, Henry Wright; Student of Christ Church, 1835–51; Chancellor of the Choir and Canon of Hereford, 1887.

***Cox, J.**; St. Giles's.

***Homfray, W.**; Infirmary.

***Cotton, William Charles**; Student of Christ Church, 1834–57; Vicar of Frodsham, Cheshire, 1857–†79.

***Greenhill, William Alexander**; Trinity, matriculated, 1832; D.Med. 1841; Physician to Radcliffe Infirmary, 1839–51; †1894. (*D.N.B.*)

***Acland, Henry Wentworth**; Christ Church, matriculated, 1834; Fellow of All Souls and M.A. 1842; M.D. 1848; K.C.B. 1884; Bart.; F.R.S.; Radcliffe Librarian, 1851; Regius Professor of Medicine, 1857–94; †1900. (*D.N.B.*)

1837. **Dean, Charles Kilshaw**; Queen's, B.A. 1840; Vicar of Over Tabley, Cheshire, 1860–81.

Walter, John; Exeter, B.A. 1840; M.P., Nottingham, 1847–59; Berks., 1868–85.

* To an unlimited attendance at the Lectures on Chemistry.

Pedder, Wilson; Brasenose, B.A. 1840; Vicar of Garstang, Lancashire, 1859.

Sconce, Robert Knox; Brasenose, B.A. 1840; Rector of St. Andrew, Sydney, N.S.W.; †1852.

Churton, Thomas Townson; Fellow of Brasenose, 1821–52.

Daubeny, J.

***Kilpin, Charles James**; Fellow Commoner of Worcester, matriculated, 1836; Student of Gray's Inn, 1838.

***Godfrey, T.**; Oxford; perhaps the surgeon, father of J. A. Godfrey, Schoolboy (p. 87).

***Noël, D. C.**; Oxford.

***Evetts, W.**; at Mr. Tucker's.

LECTURES ON THE GEOGRAPHICAL DISTRIBUTION OF PLANTS.

1837. Parker, Charles Lewes.

Ruskin, John; Christ Church, matriculated, 1836; B.A. 1842; Honorary Student, 1867; Honorary Fellow of Corpus Christi College, 1871; Slade Professor of Fine Art, 1869–79, 1883–5; †Jan. 20, 1900. (*D.N.B.*)

Swayne, George Carless; Scholar of Corpus Christi College, 1835–46; Fellow, 1846–51; Chaplain at Havre-de-Grace, 1877.

CHEMICAL LECTURES.

1838. Hobhouse, Edmund; Balliol; Fellow of Merton, 1841–57; Bishop of Nelson, N.Z., 1858–65; Assistant to Bishop of Lichfield, 1869–80.

Barrow, Francis; Wadham, B.A. 1841; Judge of County Courts, 1876–83.

Wilson, William Davis; Wadham, B.A. 1841; Vicar of Faringdon, Berks., 1849–†51.

Hitchings, George C. H.; Hon. Member of the Ashmolean Society.

Shadforth, Thomas; Fellow of University, 1839–52; Rector of Beckley, Kent, 1878–†87.

Twiss, Edward Robert; University, B.A. 1841; Curate of St. George's, Hanover Square; †1847.

Tawke, Arthur; Trinity, matriculated, 1834; D.Med. 1844.

* To an unlimited attendance at the Lectures on Chemistry.

Parsons, Henry George Joseph; Demy of Magdalen, 1838–44; Fellow, 1844–†61; B.D. 1852.

Mills, Robert Twyford; Magdalen, Clerk, 1837–42; Rector of Halse, Somerset, 1844–†74.

Savory, Thomas Roberts Douglas; Worcester, matriculated, 1837.

1839. ***Freeborn, Richard Fernandez**; 'Chirurgus,' privilegiatus, Oct. 15, 1847.

"N.B. Those who subscribe to this course will be free of admission to the one intended to be given in the succeeding Lent Term, which is supplementary to that which will be delivered in the present."—Note in Dr. Daubeny's handwriting.

Wright, Richard Franklin; St. John's, B.A. 1842; Vicar of Wrangle, co. Lincoln, 1858–†88. "N.B. No Course. Money (£2 2*s.* 0*d.*) returned" to Mr. Wright.

1840. **Hewitt, Hon. John James**; Balliol, matriculated, 1837 (second son of Viscount Lifford).

Hobhouse, Reginald; Balliol, B.A. 1839; Rector of St. Ives, Cornwall, 1844.

Deane, John William; St. John's, B.A. 1839; Vicar of Riby, 1847.

Darling, John; Christ Church, B.A. 1843; Barrister-at-Law, Inner Temple, 1846; †1858.

Deane, Francis Henry; Wadham, M.A. 1840; Barrister-at-Law, Lincoln's Inn, 1846.

? Morton, T. H.

Holme, Frederick; Fellow of Corpus Christi College, 1835–†49; Greek Reader, 1838; F.Z.S.

1841. **Tripp, Henry**; Scholar of Worcester, 1837–45; Fellow, 1845–58; Rector of Winford, co. Gloucester, 1858.

Smith, Henry; Student of Christ Church, 1837–48; Vicar of Easton-Maudit, 1847–74.

Wilson, William Davis; Wadham; III Math. 1841; M.A. 1843; Vicar of Faringdon, Berks., 1849–†51.

Wilson, John Posthumus; Fellow of Magdalen, 1834–42; Proctor, 1841; assumed name of **Parkinson** in 1840; †1874.

Holloway, J. L.

* To an unlimited attendance at the Lectures on Chemistry.

Benwell, Frederick James.

1842. **Fletcher, Jacob**; Worcester, matriculated, 1841.

Stovin, Charles Frederick; Oriel, matriculated, 1841; Barrister-at-Law, Middle Temple, 1846.

Taunton, George; St. John Street.

***Polehampton, John**; Infirmary.

1843. **Powell, Hew Steuart**; Trinity, M.A. 1835.

Lent. **Liddell, Henry George**; Student of Christ Church, 1830–46; D.D. 1855; Head Master of Westminster School, 1846–55; Dean of Christ Church, 1855–91; †1898. (*D. N. B.*)

Reynolds, Henry; Fellow of Jesus, 1831–49; Rector of Rotherfield Peppard, Oxon., 1848–†69.

Grenville, Richard Plantagenet Campbell Temple Nugent Brydges Chandos, Marquis of Chandos; Christ Church; third **Duke of Buckingham and Chandos**, 1839–61; D.C.L., 1852; President of the Council, 1866–7; Governor of Madras, 1875–80; †1889. (*D. N. B.*)

Church, Richard William; Fellow of Oriel, 1838–54; one of the originators of the *Guardian*; Rector of Wheatley, Somerset, 1854–7; Dean of St. Paul's, 1871; †1890. (*D. N. B.*)

Langton, William Henry Powell Gore; Christ Church, B.A. 1848; M.P., West Somerset; †1873.

White, Henry Master; Fellow of New College, 1839–58; Archdeacon of Grahamstown, 1871.

Williams, Charles; Fellow of Jesus, 1829–45; Principal, 1858–†77.

1844. Lent. **Story, Mervin Herbert Nevil**; assumed surname of **Maskelyne**; Wadham, B.A. 1845; Honorary Fellow, 1873; Lecturer in Chemistry and Physics, Exeter, 1855–7; Waynflete Professor of Mineralogy, 1856–95; Keeper of Mineral Department in the British Museum; F.R.S.; M.P., Cricklade, 1880–5, North Wilts., 1885–92; Honorary D.Sc. 1903.

Burd, Henry; St. Mary Hall; matriculated, 1843.

Austin, William Edmund Craufurd; Fellow of New College, 1840–63; took name of **Gourlay**; Rector of Stanton St. John, Oxon., 1877–90; †1896.

* To an unlimited attendance at the Lectures on Chemistry.

1845. **Sheppard, Joseph Brigstock**; Infirmary.

Swabey, Maurice Charles Merttins; Student of Christ Church, 1839–56; Chancellor of the Diocese of Oxford, 1868–83; Bencher of Gray's Inn, 1880–†3.

Engleheart, John Gardner Dillman; Student of Christ Church, 1844–59; Barrister-at-Law, 1849; Comptroller of the Household of the Prince and Princess Christian, 1866; Clerk of the Council of the Duchy of Lancaster.

Clarke, William Grasett; Oriel, M.A. 1846; Perpetual Curate of Charlton Abbots, 1859–66.

Poste, Edward; Fellow of Oriel, 1846; Barrister-at-Law; Director of Civil Service Examinations; †1902.

Buckland, Francis Trevelyan; Christ Church, B.A. 1848; the celebrated naturalist, Assistant-Surgeon 2nd Life Guards, 1854; founded *Land and Water*, 1866; Inspector of Salmon Fisheries, 1867–†80. (*D.N.B.*)

Cox, John Henry; St. Mary Hall, matriculated, 1841; Worcester.

Yonge, Duke; Exeter, B.A. 1846; Rector of Newton Ferrers, 1877–†81.

Rusher, Richard Eaton; (?of St. Peter's-in-the-East, Oxford).

Newman, Thomas Harding; Demy of Magdalen, 1832–47; Fellow, 1846–73; D.D.; †1882.

Parsons, John Tournay; Balliol, B.A. 1847; Vicar of Much Dewchurch, co. Hereford, 1850–†78.

Hyett, William Henry Adams; Balliol, matriculated, 1844; †1850.

Benson, Richard Meux; Student of Christ Church; B.A. 1847; Vicar of Cowley, 1850–86; Founder of the Society of St. John the Evangelist, Cowley; Bampton Lecturer.

1846. **Eaton, John Richard Turner**; Lincoln, B.A. 1845; Fellow of Merton, 1847–65; Whyte's Professor of Moral Philosophy, 1874–8; Rector of Church Lench, 1886.

Smart, George; Exhibitioner of Lincoln, 1842–8; M.A. 1849.

Layton, Thomas Charles Litchfield; Scholar of Pembroke, 1839–54; Fellow, 1854–6; Vicar of Sempringham, Lincoln, 1877.

Church, Charles Marcus; Oriel, B.A. 1845; Canon of Wells, 1879.

Fraser, James; Fellow of Oriel, 1840–61; Honorary Fellow, 1873–85; Bishop of Manchester, 1870–†85. (*D.N.B.*)

Coleridge, Henry James; Fellow of Oriel, 1845–52; seceded to Rome, 1852; editor of the *Month*, the periodical of the Jesuit Fathers, 1865–81; †1893. (*D.N.B.*)

Macaulay, John Jermy; Brasenose, matriculated, 1845; Barrister-at-Law, Lincoln's Inn, 1852–†59.

Ouseley, Sir Frederick Arthur Gore, Bart.; Christ Church, B.A. 1846; D.Mus. 1854; Honorary Student, 1867; Professor of Music, 1855; Canon of Hereford, 1886; †1889. (*D.N.B.*)

Hall, Richard William
Graham, John } not members of the University.

Neate, Charles; Fellow of Oriel, 1828–†79; Drummond Professor of Political Economy, 1857–62; M.P., Oxford City, 1863–8. (*D.N.B.*)

Boileau, John Elliot; University, B.A. 1850; Barrister-at-Law, Inner Temple, 1852; †1861.

Le Mesurier, Richard Arthur; Scholar of Corpus Christi College, 1841–8; Fellow, 1848–51; †1853.

Hext, George; Fellow of Corpus Christi College, 1847–58; Rector of Steeple Langton, Somerset, 1873.

1847. **Vincent, Cyril John**; High Street; Magdalen Hall, matriculated, 1849.

Burne, John Butler; Christ Church, B.A. 1850; Rector of Wasing, Berks, 1881.

Barmby, James; Fellow of Magdalen, M.A. 1847; Vicar of Pittington, 1875; †.

Cholmeley, Robert; Fellow of Magdalen, 1843–58; Proctor, 1854; Vicar of Findon, Sussex, 1860–†80.

Collingwood, Cuthbert; Christ Church, B.A. 1849; B.Med. 1854.

Rawstorne, Robert Atherton; Brasenose, B.A. 1846; Vicar of Balderstone, Lancashire, 1859; Archdeacon of Blackburne, 1885.

Royds, Francis Coulman; Brasenose, B.A. 1847; Rector of Haughton, co. Stafford.

Ogle, James Ambrose; Brasenose, B.A. 1846; Vicar of Sedgeford, Norfolk, 1858–74.

Daubeny, Giles Edwin; Magdalen, Demy, 1847–†50.

1848–9. Stanhope, Walter Thomas William Spencer; Student of Christ Church, 1847–52; M.P., West Riding, Yorks., 1872–80.

Aynsley, John Murray; Christ Church, B.A. 1847; Rector of Walton, Somerset, 1854–5.

Cross, Henry Assheton, Christ Church, matriculated, 1845.

Hooper, James John; Fellow of Oriel, 1848–84; Recorder of South Molton, 1877–84.

Ross, Charles Douglas; Fellow of Wadham, 1848–†82.

Hector, J. F.

Bunny, Edward John; Christ Church; adopted name **St. John.**

Board, John; Christ Church, B.A. 1850; J.P., Kent.

Bulley, Frederick; Magdalen, Fellow, 1837; D.D.; President of Magdalen, 1855–†85.

Massey, Augustus Shakespear Oliver; Magdalen, matriculated, 1847.

1849. Markby, William; Postmaster of Merton, 1846–50; D.C.L.;
Mich. Reader in Indian Law, 1878; Fellow of Balliol, 1883.

Churchill, B. B.

Stokes, Edward; Student of Christ Church, 1842–60; Vicar of Staines, Middlesex, 1859–†63.

Marshall, George; Student of Christ Church, 1837–58; Vicar of Pyrton, Oxon., 1857–75; of Milton, Oxon., 1875; †.

Conybeare, Charles Ranken; Student of Christ Church, 1839–53; Vicar of Pyrton, Oxon., 1852–7; of Itchin Stoke, Hants, 1857–†85.

Prout, Thomas Jones; Student of Christ Church, 1842; Vicar of Binsey, 1857.

Thomson, William; Fellow of Queen's, 1840–55; Provost, 1855; Bishop of Gloucester and Bristol, 1861; Archbishop of York, 1862; †1890. (*D.N.B.*)

Merriman, Henry Gordon; Fellow of New College, 1843–52; Head Master of Royal Grammar School, Guildford, 1859–74; Rector of East Woodhay, 1884–†87.

Bowles, Samuel James, Magdalen, B.A. 1849; Fellow, 1855; Rector of Beaconsfield, Bucks, 1857–†65.

Lewis, William Lempriere; Scholar of Trinity, 1848–52; Fellow, 1852–8; †1872.

?**Hester, James Terry**; 'chirurgus,' privilegiatus, June 11, 1821.

Hansell, Henry; Balliol, matriculated, 1848; Demy of Magdalen, 1851–61; Fellow, 1861–†89.

Sievers, Albert; Dr. Ph.

Heathcote, William Beadon; Fellow of New College, 1832–53; Warden of Radley; Rector of Compton Bassett; †1862.

Knight, John Walker; Chorister; Fellow of Magdalen, 1849–66; Demy, 1845–9; Vicar of Washington, Sussex, 1865–96.

Millard, James Elwin; Chorister, 1835; B.A. 1845; School Master, 1846; Fellow, 1853–65; Vicar of Basingstoke, 1864; Hon. Canon of Winchester, 1882; †.

Choristers and Schoolboys from Magdalen College School:—

Sanders, William; Chorister, 1846–50; Clerk, 1850–7; Master of Woodford Grammar School; †1869.

Standen, George Horn; Chorister, 1848–51.

? **Inman, Edward**; Schoolboy, 1848–53; in Holy Orders.

Jones, Everard; Schoolboy, 1849–54.

Acock, Edgar Morton; Chorister, 1844; B.A. 1859; Vice-Principal of Carmarthen Training College, 1861–3; Chaplain of Christ Church, 1863–73; Vicar of Market Lavington, Wilts., 1873–†5.

Vincent, Joseph Henry, 1849–†52.

Hall, Edward Vine; Chorister, 1845–55; Vicar of Spring Grove, Middlesex, 1870–8; Minor Canon, &c., Worcester, 1877; Vicar of Bromsgrove, 1889.

Ward, John Budgeon; Chorister, 1842–50.

Giles, Arthur Henry; Chorister, 1849.

? **Green, Richard Eling**; Schoolboy, 1849; or perhaps **John Richard Green**, the eminent Historian, who entered the School in 1847.

Kett, Edward; Chorister, 1847.

Haden, Charles Henry; Chorister, 1847.

Holiwell, Walter Currer; Chorister, 1844–50.

Sutton, Frederick John; Chorister, 1845.

Godfrey, James Alfred; Schoolboy, 1849–51; Royal Marines.

Dicks, Edward George; Chorister, 1846–53; matriculated, Magdalen Hall, 1857.

Mills, William; Schoolboy, 1849–52.

Hansell, Thomas William; Chorister, 1849.

1850–1. **Fox, Edward Long**; Balliol, B.A. 1854; D.Med. 1861; †.

Adam, George Read; St. Mary Hall, B.A. 1852; Vicar of Shoulden, Kent, 1877.

Chichester, Charles; Magdalen, matriculated, 1847; J.P., D.L., Devon.

[**Sanders, W.**]*

Kempe, Reginald Carlisle; Demy of Magdalen, 1850–8; M.A. 1857; Rector of Hawkwell, Essex, 1858; seceded to Rome.

Hill, Edward; Demy of Magdalen, 1849–65; Rector of Ashurst, Sussex, 1865–92; Vicar of Boxgrove, Sussex, 1892.

Meyrick, Llewellyn; Demy of Magdalen, 1848–54; Fellow, 1854–†87. (Orders.)

[**Sanders, W.**]*

Mitchell, Alexander; Christ Church, matriculated, 1848; M.P., Berwick-on-Tweed, 1865–8; †1873.

Clements, Henry George John; Christ Church, B.A. 1852; Vicar of Sidmouth, Devon, 1865.

Vaughan, Henry Halford; Fellow of Oriel, 1835–42; Regius Professor of Modern History, 1848–58; †1885. (*D.N.B.*)

Deane, Charles Henry; Demy of Magdalen, 1850; Fellow, 1855–63; Vicar of Willoughby, co. Warwick, 1885.

Knox, Arthur; Scholar of St. John's, 1844–7; B.A. from St. Mary Hall, 1850.

? **Hugell, P. T.**

Wintle, Frederick Thomas William; Magdalen, Chorister, 1842–7; Clerk, 1849–54; Rector of Bere Ferrers, Devon, 1875.

[**Sanders, W.**; Magdalen.]*

1852. Lent. **Hankey, Frederick Alers**; Oriel, B.A. 1855; M.P., West Surrey, 1885.

* The frequent appearance of the name of Mr. Sanders in this year recalls an anecdote related to the editor by Mrs. Bulley, the wife of the late President of Magdalen College and niece of Dr. Daubeny, that at one time the undergraduates attending the lectures used to make bets with one another concerning the number of times it was possible to enter their names on the record of attendances at the same lecture without attracting the notice of the learned Professor.

Luke, William Henry Colbeck; Oriel, B.A. 1853; Vicar of St. Matthias, Earl's Court, London, 1878.

Tyler, John Chatfield; Oriel, matriculated, 1850.

Trevilian, William John Cely; Oriel, matriculated, 1850; †.

Cox, Thomas Adey; Oriel, B.A. 1852.

Turner, W. H.; High Street.

Cordeux, Godfrey Pigott; Fellow of Worcester, 1852–6; Vicar of Ravenfield, Yorks., 1874–81.

Hale, John Godwin; Oriel, B.A. 1852; Rector of Therfield, Herts, 1870.

Norman, Alfred Merle; Christ Church, B.A. 1852; D.C.L., F.R.S., F.L.S.; Honorary Canon of Durham, 1885.

Sutton, Frederick Heathcote; last Gentleman Commoner of Magdalen, B.A. 1856; Prebendary of Lincoln, 1883–†8.

Packe, William James; Christ Church, B.A. 1855; Vicar of Feering, Essex, 1873.

Wilson, John Matthias; Fellow of Corpus Christi College, 1841–69; Whyte's Professor of Moral Philosophy, 1846–74; President of Corpus Christi College, 1872–†81. (*D.N.B.*)

Prichard, Constantine Estlin; Fellow of Balliol, 1842–54; Rector of South Luffenham, co. Lincoln, 1854–†69.

Trinder, Daniel; Exeter, S.C.L. 1851; Vicar of Teddington, 1857–78, and of Highgate, 1878–†88.

1852. **Taylor, W. R.**; Paradise House.

Mich. **Arnold, Edwin**; University; English Verse, 1852; B.A. 1854; Principal of Deccan College, Poona, Bombay, 1856–61; K.C.I.E.; C.S.I.; Officer of White Elephant of Siam, &c.

Langston, W.

Wellford, John Francis; Worcester, matriculated, 1851; Gentleman Commoner of Magdalen Hall, 1857; M.A. 1863.

Brown, Henry; High Street.

Child, Gilbert William; Exeter, B.A. 1854; D.Med. 1859; Nat. Sci. Examiner, 1867; †.

Dumbleton, Horace; Exeter, matriculated, 1850; New Inn Hall, B.A. 1855.

Welch, Christopher; Wadham, B.A. 1855.

Nicholl, Edward Powell; Brasenose, B.A. 1855; Vicar of Ascot-under-Wychwood, Oxon., 1883–5.

Crickmer, William Burton; St. Edmund Hall, Exhibitioner and Bible Clerk, 1851; Assistant Perpetual Curate of Beverley Minster, Yorks., 1864.

Richey, James Bellett; Scholar of Exeter, 1852–4; I.C.S., 1856; C.S.I., 1878.

Coke, George Francis; Exeter, B.A. 1854; Vicar of Titley, co. Hereford, 1877–85.

Hudson, John; Christ Church, matriculated, 1850.

Davies, Arthur Henry Saunders; Christ Church, matriculated, 1850; Student of Inner Temple, 1854; †1873.

Barker, George William; Christ Church, B.A. 1853; Barrister-at-Law, Inner Temple, 1857–†69.

Corbett, Lionel; Christ Church, B.A. 1854; Vicar of Condover, Salop, 1873; Rector of Hampton Bishop, 1887.

Walters, William; Christ Church, B.A. 1854; Honorary Canon of Worcester, 1881.

Wethered, Thomas Owen; Christ Church, matriculated, 1850; M.P., Marlow, 1868–80.

Mills, Charles Henry; Christ Church, B.A. 1851; M.P., West Kent, 1868–85; created **Lord Hillingdon**, 1886; †1898.

Ross, George Gould; Scholar of St. Mary Hall, 1851–5; D.C.L. 1875; Canon of Grahamstown, 1876–83, &c.

Cotton, Arthur Benjamin; Christ Church, B.A. 1854; Rector of Hartley Maudit, Hants, 1879–86.

Cazenove, Arthur; Exeter, B.A. 1853; Vicar of St. Mark, Reigate, 1859.

Smith, Richard Goodlake; Exeter; B.A. 1854.

Longe, Francis Davy; Oriel, B.A. 1854; Inspector Local Government Board, 1871.

Stent, Henry; Exeter, B.A. 1853; Vicar of Fairlight, Sussex, 1857.

Medley, John Bacon; Exeter, B.A. 1856; Rector of Orchardleigh-cum-Lullington, Somerset, 1875.

Nicholls, Henry Cornelius; Exeter, matriculated, 1850.

Colborne, Joseph Veel; Magdalen Hall, matriculated, 1850.

Tucker, Henry William; Magdalen Hall, B.A. 1854; Secretary of Society for Promoting the Gospel, 1879.

Le Mesurier, George Frederick; Exeter, B.A. 1855; Rector of Didmarton, co. Gloucester, 1870.

Marshall, Robert Manning; Exeter, B.A. 1855; Rector of Hedenham, Suffolk, 1859–1900.

Garton, Joseph; Exeter, B.A. 1855; Chaplain to the King of Hanover.

1853. Mich. **Randolph, Bernard Montgomery**; Christ Church, B.A. 1857.

Bligh, Hon. Henry; Christ Church, matriculated, 1852; Vicar of Nettlebed, Oxon., and of Abingdon, Berks., 1874–8; of Holy Trinity, Fareham, 1893–1902.

Cardwell, Edward Henry; University, B.A. 1855.

Dry, Edward; University, B.A. 1857; M.A. 1859.

Hawkins, Bradford Robert John; St. John's, B.A. 1854; Vicar of Eyton, co. Hereford, 1867–75.

Webster, Edward Mercer; Brasenose, B.A. 1854; Rector of Chingford, Essex, 1872–8.

Puxley, Henry Lavallin; Brasenose, B.A. 1855; High Sheriff, Carmarthen, 1864.

Wilson, Edward Thomas; Exeter, B.A. 1855; B.Med. 1858.

Webb, Godfrey John; Brasenose, B.A. 1854.

March, George Edward; St. Mary Hall; matriculated, 1850; Clerk in Foreign Office, 1855; Secretary to Royal Commission on Extradition, 1877; C.M.G., 1881.

Jones, R. F.

Rayson, William; Magdalen Hall, B.A. 1856; Vicar of Lindridge, co. Hereford, 1873–95.

Williams, Edleston Richard; Magdalen Hall, B.A. 1856; Perpetual Curate of Smallwood, co. Stafford, 1862.

Harrison, James Harwood; Magdalen, B.A. 1857; Rector of Bugbrooke, Northants, 1859.

Millard, Frederick Maule; Demy of Magdalen, 1853–67; Fellow, 1867–70; Rector of Otham, Kent, 1869.

? **Howell, Robert Williams**; Jesus, Scholar, 1849–54; Fellow, 1854–†80.

Willmott, Henry; Pembroke, B.A. 1856; Rector of Kirkley, Suffolk, 1860–70; †1872.

Lee, Matthew Henry; Scholar of Brasenose, 1850–4; Vicar of Hanmer, Flints., 1867.

Foxton, William; Magdalen Hall, B.A. 1856.

Battye, William Henry; Magdalen Hall, matriculated, 1852.

Tuckwell, Henry Matthews; Exhibitioner of Lincoln, 1852–7; D.Med. 1863.

Murray, George; Magdalen Hall, B.A. 1856.

Biddulph, Thomas Tregenna; University, matriculated, 1850.

Day, Charles; Lincoln, B.A. 1856; Vicar of Hollym with Withernsea, Yorks., 1864.

Woodall, Charles William; University, B.A. 1855; Barrister-at-Law, Inner Temple, 1859.

Beale, Seaman Curteis Tress; Wadham, B.A. 1854; Vicar of St. Michael, Tenterden, 1864–81; †1885.

Lloyd, William Henry; Magdalen, B.A. 1856; Vicar of Christ Church, Eastbourne, 1864–70; Chaplain at Valparaiso, 1870–83.

Woodall, John Woodall; Oriel, B.A. 1854; Banker, and Mayor of Scarborough, 1882, 1886; F.G.S.

Pellew, George Israel; University, B.A. 1854; Rector of Peterston, co. Hereford, 1886.

Johnston, Samuel Henry Nairn; Pembroke, B.A. 1854; Lieutenant-Colonel, formerly 20th Foot.

1854. Lent. **Leigh, Edward Chandos**; Oriel, matriculated, 1851; Fellow of All Souls, 1855–71; Q.C. 1881; Counsel to Speaker of House of Commons, 1883; K.C.B.

Walker, Charles Henry; Oriel, B.A. 1857; Vicar of Walkhampton, Devon, 1863.

Henning, William Walter; Oriel, matriculated, 1851.

Court, David Alexander; Oriel, matriculated, 1850; B.A. 1855; Incumbent of Kangaroo Point, Queensland, 1855.

Willoughby, Edward Carlile; Oriel, B.A. 1856; Barrister-at-Law, Inner Temple, 1858; †1886.

Walker, Henry Aston; Oriel, B.A. 1856; Vicar of St. James's, Hatcham, Surrey, 1879–85; Vicar of Chattisham, Suffolk, 1891.

Master, Streynsham Mosley; Balliol, B.A. 1856.

Almond, Hely Hutchinson; Balliol, B.A. 1855; Head Master of Loretto School; †.

Allan, Hugh; Wadham, B.A. 1856; Vicar of Ravenstone, 1872.

Sillifant, Charles William; St. John's, B.A. 1854; Rector of Wear Gifford, Devon, 1857–81.

De Brisay, Henry De La Cour; University, B.A. 1855; Diocesan Inspector of Schools for Deanery of Oxford, 1879.

Saunders, William; Magdalen Hall, matriculated, 1851; aged 38.

Broughton, Vernon Deloes; Magdalen, matriculated, 1853; Master of the Mint, Melbourne, 1880–4; †1886.

Salmon, Henry Thomas; Magdalen, B.A. 1858; J.P., D.L., Gloucestershire; Barrister-at-Law, Lincoln's Inn, 1862; †.

Moreton, Hon. Berkeley Basil; Magdalen, matriculated, 1853; Postmaster-General of Queensland, 1885.

Trotman, William Charles; Fellow of New College, 1852–68; Student of Middle Temple, 1856.

Witherby, William Henry; Oriel, B.A. 1855.

Frye, Arthur William; Oriel, B.A. 1855.

Charles, George; Exeter, B.A. 1856; of Lincoln's Inn, 1857.

Daubeny, John; Exeter, B.A. 1857; Chancellor of Sarum, 1868–77; Vicar of Winkfield, Berks., 1881.

Robinson, Herbert Harold; Exeter, B.A. 1855; Vicar of St. Andrew's, Burnley, 1867.

Herklots, Gerard Andreas; Exeter, B.A. 1856; Vicar of St. Saviour's, South Hampstead, 1872.

Fisher, Charles Edmund; Exeter, matriculated, 1851.

Luney, Thomas Hodson Radcliffe; Exeter, B.A. 1855.

Newman, Augustus; St. John's, B.A. 1855; B.Med. 1859.

Lewis, Forster; St. John's, B.A. 1855; Rector of Wotton-Fitzpaine, Dorset, 1864.

Mellory, George; Magdalen Hall, B.A. 1857; †1864.

Birley, Alfred; Balliol, B.A. 1855; Vicar of Bolton-le-Sands, co. Lancaster, 1874.

Ravenhill, Henry Everett; University, B.A. 1855; Vicar of Buckland Newton, Dorset, 1860.

Denne, Richard Henry; University, B.A. 1856; Rector of Brimpsfield, co. Gloucester, 1879.

Good, Charles; Exeter, B.A. 1856.

Smallwood, Edward Bosworth; Worcester, B.A. 1855; Rector of Newton Linford, co. Leicester, 1872–†74.

Glenn, Richard; Worcester, B.A. 1856.

Monson, Hon. Edmund John; Balliol, matriculated, 1852; Fellow of All Souls, 1858–82; Minister at Copenhagen, 1885–8; Athens, 1888; P.C., G.C.B., D.C.L., G.C.M.G.; Ambassador to the Emperor of Austria, 1893, and to the French Republic.

Bennett, Barwell Ewins Worthington; Oriel, B.A. 1853; Rector of Corby, co. Lincoln, 1873, and Rural Dean.

Wodehouse, Hon. Henry; Balliol, B.A. 1855; Secretary of Embassy, Athens; †1873.

Walters, Robert; Balliol; B.A. from St. Mary Hall, 1855; of Ware Priory, Herts; Barrister-at-Law, Inner Temple, 1857.

Beaumont, Francis Henry; Oriel, B.A. 1856; Treasurer for the County of Surrey.

Daubeny, Thomas; St. Mary Hall, B.A. 1855; Vicar of Ampney, Gloucester, 1876–†87.

Austin, William George Gardiner; Magdalen, Demy; B.A. 1858; Chaplain to Bishop of Guiana, 1860–91; Rector of Stanway, Essex, 1891–7; †1903.

Day, Hermitage Charles; Brasenose, B.A. 1855; Vicar of Bredhurst, Kent, 1864–78.

Malcolm, John Wingfield; Christ Church, B.A. 1856; M.P. for Boston, 1860–8, 1874–8.

Greatorex, Thomas; Pembroke, matriculated, 1851.

King, William Oliver Meade; Pembroke, B.A. 1863; Inspector of Factories.

Cooper, Frank; Magdalen, B.A. 1857; Curate of Long Compton, co. Warwick, 1868–†70.

Dashwood, Charles Lewes; Fellow Commoner of Oriel, B.A. 1855.

Hankey, Reginald; St. Mary Hall, B.A. 1854; †1886.

Thynne, Arthur Christopher; Balliol, B.A. 1855; Rector of Kilkhampton, 1859; Treasurer and Honorary Canon of Truro, 1877.

Codrington, John Edward; Scholar of Brasenose, B.A. 1856.

Knipe, Christopher; Scholar of Brasenose, 1852–7; B.A. 1855; Vicar of Erlestoke, 1878.

Hitchcock, William Henry; University, B.A. 1855; Vicar of Christ Church, Derryhill, Wilts., 1871.

Owen, Edmund John; Scholar of Brasenose, 1850–4; Rector of Tretire, co. Ross, 1860.

Atwood, Arthur Thomas; Brasenose, B.A. 1855; Rector of Bromeswell, Suffolk, 1870.

Stiles, Robert Canning; Scholar of Brasenose, 1851–7; Head Master of Shepton Mallet Grammar School, 1872–80.

Hasler, William Wyndham; Christ Church, matriculated, 1851; J.P., Sussex.

Robinson, Thomas Bond Bird; Christ Church, matriculated, 1850; B.A. 1854; Rector of Milton, Hants, 1875.

Pember, Edward Henry; Student of Christ Church, 1854–61; Q.C. 1874; Bencher of Lincoln's Inn, 1876.

Lendon, George Charles Comyns; Christ Church, matriculated, 1850.

Ethelston, Robert Peel; Christ Church, matriculated, 1850; J.P., Salop.

Nind, Philip Henry; Christ Church, matriculated, 1850; Gold Commissioner in British Columbia.

Luttrell, Edward Fownes; Christ Church, matriculated, 1851.

Pemberton, Richard Laurence; Pembroke, matriculated, 1851; High Sheriff of Durham, 1861.

Hooper, Thomas Aylesbury; Pembroke, B.A. 1854; Rector of Cooling, Kent, 1863–75; †1882.

Bent, John Oxenham; Pembroke, B.A. 1855; Vicar of St. John Evangelist, Woolwich, 1868.

Gordon, Henry Doddridge; Scholar of New College, 1852–61; Rector and Vicar of Harting, Sussex, 1864.

Pode, John Duke; Fellow of New College, 1853–61; Barrister-at-Law, Inner Temple, 1858.

Farrar, Adam Storey; Michel Fellow of Queen's, 1852–63; Tutor at Wadham, 1855–63; Bampton Lecturer, 1862; Professor of Divinity and Ecclesiastical History, Durham, 1864; Canon of Durham, 1878.

Vernon, Sir Henry Foley, Bart.; Magdalen; High Sheriff, co. Worcester, 1873; M.P., East Worcestershire, 1861–6; created a Baronet, 1885.

England, Russell; Exeter, matriculated, 1851; of Lincoln's Inn, 1852.

Law, Alexander Patrick; Corpus Christi College, 1851; of New Inn Hall, 1856; B.A. and M.A. 1860.

Dowell, Stephen; Corpus Christi College, B.A. 1855; of Lincoln's Inn, 1863.

Preston, William; Oriel, matriculated, 1851 (now William Warcup Peter **Consett**).

Alleyne, Arthur Osborn Gibbes; Oriel, B.A. 1855; Rector of St. Edmund, Exeter, 1863.

Southey, Reginald; Christ Church, B.A. 1857; D.Med. 1866; Lunacy Commissioner, 1883.

Roberts, Erasmus Coryton; Queen's, B.A. 1855; J.P., D.L., Cornwall.

Penrose, Samuel Welsted; Magdalen Hall, B.A. 1856; Incumbent of Rincurran, co. Cork, 1890.

Brown, George James; Christ Church, B.A. 1854; Domestic Chaplain to Duke of Marlborough, 1858; Incumbent of St. John Evangelist, Edinburgh, 1883.

Clark, George O.; Pembroke; matriculated, 1851.

1854. **Wood, T. J.**; of Broad Street, Oxford.

Mich. **Jelly, Harry Richardson**; Brasenose, B.A. 1854.

Hopkins, Thomas Henry Toovey; matriculated at Trinity; Demy of Magdalen, 1853–6; Fellow, 1856–†85.

Hutton, Edmund Forster (Drummond); Corpus Christi College, B.A. 1856; D.D. 1870; Incumbent of St. Columba, Crieff, 1867–72.

Barrett, George Kimbell; Oriel, B.A. 1855.

Caird, Henry William; Oriel, B.A. 1855.

Liddon, Henry John; Exeter, B.A. 1859; Vicar of South Milton, Devon, 1887–92.

Welby, Walter Hugh Earle; Corpus Christi College, B.A. 1855; Rector of Harston, co. Leicester, 1867.

Ollivant, William Spencer; Corpus Christi College, B.A. 1858; †1876.

Browne, Jemmett; Corpus Christi College, B.A. 1855; Barrister-at-Law, Lincoln's Inn, 1867; Private Secretary to Permanent Secretary, Board of Trade, 1868–84.

Duthoit, William; Exeter, matriculated, 1853; D.C.L. 1876; Judicial Commissioner of Oudh.

Joyce, Charles; Exeter, B.A. 1857; Rector of Fulmer, Bucks, 1875.

Des Vœux, Sir George William; Balliol; Governor of Newfoundland, 1886, and Hong Kong, 1887–91; G.C.M.G.

Pryor, John Eade; Magdalen, B.A. 1858; Rector of Bennington, Herts, 1860–81; †1884.

Bell, William Alfred; Queen's, B.A. 1856.

Craster, Thomas Henry; University, B.A. 1857; Rector of Denton, co. Lincoln, 1886.

Booth, Thomas; University, B.A. 1857.

Shepherd, Francis Burton; Oriel, B.A. 1856; Rector of Margaret Roding, Essex, 1861.

Rudd, Henry; Corpus Christi College, B.A. 1857; D.C.L. 1865; †1880.

1855. Lent **Sergeant, Edmund William**; Balliol, B.A. 1858; Assistant Master at Winchester College; Vicar of Moordown, Hants, 1886.

Wilson, Robert Dobie; Exhibitioner of Balliol, 1854–61; Barrister-at-Law, Lincoln's Inn, 1862.

Curzon, Richard; Brasenose, B.A. 1857; in Orders; †1863.

Mather, Edward; Brasenose, B.A. 1858.

Risley, William Cotton; Exeter, B.A. 1856; Rector of Shelstone, Berks., 1878.

Causton, Charles Purefoy; Exeter, B.A. 1856; Rector of Stretton-on-Fosse, co. Gloucester, 1866.

Berkeley, Sackville Hamilton; Oriel, B.A. 1856; Vicar of St. James's, Devonport, 1884; Heavitree, Exeter, 1885.

Houseman, John; Exeter, B.A. 1856; Rector of Brobury with Bredwardine, 1871–†77.

Coulthurst, Nicholas; Magdalen Hall, matriculated, 1851.

Sturton, Jacob; Trinity, B.A. 1856; Rector of Woodborough, Wilts., 1881.

Sainsbury, Thomas Ernest Langford; Trinity, B.A. 1856; Rector of Ellingham, 1883; Rector of Beckington with Standerwick, 1892.

Finch, Henry Charles; Trinity, B.A. 1856; Barrister-at-Law, Lincoln's Inn, 1859.

Williams, Anthony; Exeter, B.A. 1858; Vicar of Coaley, co. Gloucester, †1862.

Allen, Herbert Lockyer; Exeter, matriculated, 1854.

Alexander, William Henry; Pembroke, B.A. 1856; Barrister-at-Law, Inner Temple, 1860.

Dickins, Herbert Stewart; Pembroke, matriculated, 1852.

Thomson, John; Exeter, B.A. 1857; of Woodperry House, Oxon.; J.P.

Birley, Arthur; Pembroke, B.A. 1856.

Molyneux, William More; Pembroke, B.A. 1857; Clerk in House of Commons.

Cornish, Charles John; Exhibitioner of Corpus Christi College, B.A. 1856; Rector of Childrey, Berks., 1882.

Lance, Henry Porcher; Brasenose, B.A. 1856.

Chamberlayne, Edward Tomes; Brasenose, B.A. 1855; Rector (and Patron) of Witherley, co. Warwick, 1871.

Pritchard, Thomas Sirrell; Brasenose, B.A. 1855; Recorder of Wenlock, †1879.

Swainson, Oswald Lister; Brasenose, B.A. 1856.

Parker, William Windsor; Merton, B.A. 1855; Barrister-at-Law, Lincoln's Inn, 1861.

Lambert, William Henry; Postmaster of Merton, 1852–6; Rector of Stoke Edith, co. Hereford, 1858.

Mercer, John Francis; Exeter, B.A. 1857.

LECTURES ON AGRICULTURAL CHEMISTRY.

1855. Oct. **Gough, Walter Henzell**; Worcester, B.A. 1858; Vicar of Great Maplestead, Northants, 1883.

Wyndham, Edmund; Magdalen, B.A. 1857; Barrister-at-Law, Lincoln's Inn, 1861; Vicar of Yeovil, 1873–84.

Parry, William Warner; Worcester, B.A. 1858; Chaplain Royal Navy, 1866; Retired List, 1885.

Poulden, James Bedford; Worcester, B.A. 1856.

Young, William Edward Allen; Worcester, B.A. 1856; Rector of Pyecombe, Sussex, 1875.

Joy, Samuel; Worcester, B.A. 1856; Vicar and Precentor of Ripon, 1875–84.

Vaughan, Arthur Chichele Chambrè; Worcester, B.A. 1857; Vicar of Lambley, Northumberland, 1862–95; Rector of Ingram, 1895.

Barnwell, John Clement; Worcester, B.A. 1858.

Allan, William; Worcester, B.A. 1859; Vicar of St. James, Bermondsey, 1874.

Andrews, William Ryton; Wadham, B.A. 1857; Rector of Teffont-Ewyas, 1873.

Allen, William Halphide; New Inn Hall, S.C.L. 1855; Barrister-at-Law, Lincoln's Inn, 1861.

Scott, John Arthur Henry; Magdalen Hall, B.A. 1858; Vicar of Portfield, Sussex, 1879–†81.

Bluett, William James; Magdalen Hall, B.A. 1859.

Copestake, John; Magdalen Hall, matriculated, 1854; M.A. 1864; Rector of Trusley, co. Derby, 1866.

Mason, Charles; Worcester, B.A. 1856; Vicar of Farlsthorpe, 1880.

Cooper, Frank; Magdalen, B.A. 1857; Curate of St. Mary Magdalen, Oxford, 1857–68; †1870.

Hugessen, William Weston Knatchbull-; Magdalen, matriculated, 1855; †1864.

Plumptre, Charles John; University, B.A. 1858; High Sheriff of Kent, 1877; †1887.

Booth, Thomas; University, B.A. 1857; of the Inner Temple, 1858.

Barrow, George Staunton; Pembroke, B.A. 1857; Vicar of Stowmarket, 1876–†84.

Rolt, John; University, B.A. 1857; Barrister-at-Law, Inner Temple, 1859–74; †1876.

Field, George Hanbury; University, B.A. 1858; Barrister-at-Law, Lincoln's Inn, 1861.

Heberden, George; Oriel, B.A. 1856; Vicar of Clifton Hampden, Berks., 1882.

Burroughes, Robert; Oriel, B.A. 1858; Rector of Beighton, Norfolk, 1867–78.

Bayley, William Rutter; Oriel, B.A. 1858; Vicar of Cassington, Oxon., 1869–†75.

Barter, Robert Bruce; Oriel, B.A. 1858; Rector of Greinton, Somerset, 1861.

Trotman, William Charles; Fellow of New College, 1852–68.

Wormald, Robert Bownas; Bible Clerk of Lincoln, 1852–6.

Wintle, Ogle Richard; Exhibitioner of Lincoln, 1853–8; Head Master of King James's Grammar School, Bishop Auckland, 1864–†75.

Swann, John; Oriel, B.A. 1858.

Mangles, Arthur Onslow; Magdalen, B.A. 1858.

LECTURES ON AGRICULTURAL CHEMISTRY.

1856. **Downing, Henry Edward**; ? Christ Church, matriculated, 1853 (Magdalen Hall); Rector of Wells, Norfolk, 1864–†71.

Hellier, Thomas Bradney Shaw; Brasenose, matriculated, 1855.

Cass, George Grainger; Wadham, B.A. 1858; Vicar of Middlesmoor, Yorks., 1864.

Nicholls, Henry; Wadham, B.A. 1859.

Inman, Edward; Oriel, B.A. 1857; Vicar of Gillingham, Dorset, 1882–91; Rural Dean of Potterne, 1892–1900.

Twiss, Quintin William Francis; Student of Christ Church, 1853–61.

Mitford, Algernon Bertram; Christ Church, matriculated, 1855; Secretary of Embassies at St. Petersburg, Pekin, &c.; Secretary to Commissioners of Public Works, 1874; C.B.

Lawrence, Christian William; Magdalen, matriculated, 1855; Minister resident at Quito.

Forbes, James Hunter; Oriel, matriculated, 1853; †1881.

Rendel, Stuart; Oriel, B.A. 1857; Barrister-at-Law, Inner Temple, 1861–77; M.P. April, 1880; President of University Colleges of Wales; created **Baron Rendel**, 1894.

Cave, William Cecil Cave-Browne; Magdalen, B.A. 1860; Incumbent of St. Thomas's, Willoughby, N.S.W., 1871.

Cassan, Ernest John Plantagenet; Magdalen Hall, B.A. 1861.

Courtenay, John Irving; Trinity, B.A. 1857; Barrister-at-Law, Lincoln's Inn, 1861.

Elers, Frederick Wadham; Trinity, B.A. 1858.

Hartley, Arthur Robert; St. John's, B.A. 1857; Vicar of Wool, Dorset, 1879.

Hooper, Haines Edward; Jesus, B.A. 1857; B.C.L. 1870; Curate of Chedworth, 1858–79.

Willett, Albert Lewis, Brasenose, B.A. 1858; Vicar of Meriden, co. Warwick, 1873–1901.

Fisher, Albert Bulteel; Corpus Christi College, B.A. 1857; Fellow, 1863–77.

Otter, Robert Henry; Corpus Christi College, M.A. 1863.

Marsham, Cloudesley Dewar Bullock; Merton, B.A. 1857; Vicar of Stoke Lyne, Oxon., 1868.

Mew, James; Wadham, B.A. 1860; Barrister-at-Law, Inner Temple, 1864.

Pusey, Henry Bouverie; Christ Church, B.A. 1860; Lieutenant 76th Foot; †at sea, 1869.

Edmondson, Thomas Grassyard; Brasenose, B.A. 1858; J.P., Lancashire.

Parkinson, John; St. Mary Hall, B.A. 1856.

Thorp, John; Magdalen Hall, B.A. 1859; Vicar of Darsham, Suffolk, 1866; Vicar of Felbridge, Surrey, 1889.

Bingley, John George; Brasenose, B.A. 1857; Rector of Snodland, Kent, 1874.

Cleather, Henry; Oriel, B.A. and M.A. 1860.

Morris, Frank Howe; Worcester, B.A. 1859.

Matthews, William Edgar; Pembroke, B.A. 1857; Student of Lincoln's Inn.

Harvey, Herbert; Christ Church, B.A. 1857; Rector of Hinstock, Stafford, 1876.

Buller, James Howard; Christ Church, B.A. 1858; †1874.

Dyke, Thomas; Christ Church, B.A. 1857; Civil Engineer.

Whish, George Clinton; Christ Church, B.A. 1857.

Browne, William Clayton; Christ Church, matriculated, 1855; J.P., D.L., Carlow; High Sheriff, 1859.

Sale, Thomas Walker; Wadham, B.A. 1858; Vicar of Skendleby, co. Lincoln, 1872–83; Diocesan Inspector of Schools, 1874–86; Rector of Halton Holgate, 1883.

Preston, John Wilby; Wadham, B.A. 1858.

Gully, John; Wadham, B.A. 1857; Barrister-at-Law, Inner Temple, 1860.

Lawson, Henry Graham; Wadham, B.A. 1856; Barrister-at-Law, Middle Temple, 1863.

Holroyd, Hon. Douglas Edward; Christ Church, B.A. 1857; †1882.

Adair, Hugh Jenison; Christ Church, B.A. 1859; Vicar of Bradford, Wilts., 1861–85.

Upperton, Clement; Christ Church, B.A. 1858; of the Middle Temple, 1857.

Williams, Arthur Charles Vaughan; Student of Christ

Church, 1853–68; Vicar of Down Ampney, Wilts., 1868–†75.

Vincent, Sir William, Bart.; Christ Church, B.A. 1857; Rector of Postwick, Norfolk, 1864–87; D'Abernon Chase, Leatherhead; J.P., D.L.

Kennedy, John Gordon; Corpus Christi College, matriculated, 1854.

Richards, Walter John Bruce; St. Mary Hall, matriculated, 1854.

Otter, John; St. Mary Hall, B.A. 1858; Vicar of Ranby, co. Lincoln, 1861–5.

Williams, Llewellyn Paganus; Magdalen Hall, B.A. 1860; Rector of Dodington, Somerset, 1866–76; Rector of Bourton-on-the-Water, 1888.

Bosanquet, Charles Bertie Pulleine; Balliol, B.A. 1857; Barrister-at-Law, Lincoln's Inn, 1861.

Mackey, Clement William; Worcester, B.A. 1858.

Buckland, William John; Worcester, B.A. 1860; Vicar of Hankerton, Wilts., 1864.

Williams, John Ignatius; Jesus, matriculated, 1853; B.A. from New Inn Hall, 1858; Stipendiary Magistrate for Pontypridd, 1884.

Strother, James Baxter; Magdalen Hall, B.A. and M.A. 1863; Vicar of Shaugh Prior, South Devon, 1878.

[*End of the 4to Lecture List.*]

Register of Persons who attended the Catechetical Lectures given to the Members of Magdalen College, beginning October 28, 1855.

[*From the 8vo Lecture List.*]

1855. Oct. **Alington, Henry Giles**; B.A. 1859; M.A. 1865; Inspector of Schools; Vicar of Candlesby, Lincolnshire.

Allen, Richard Collyns; matriculated, 1855.

Farley, William.

Griffith, George; Jesus; II Cl. Mod., II Math. Mod. 1855; I Nat. Sci. 1856; Nat. Sci. Examiner, 1861–2, 1864–5; Assistant General Secretary, British Association, 1862–78 and 1890–1901; †.

Harrison, James Harwood; B.A. 1857; Rector of Bugbrooke, Northants, 1859.

Lloyd, William Henry; B.A. 1856; Vicar of Christ Church, Eastbourne, 1864–70; Chaplain at Valparaiso, 1870–83.

1856. Jan. **Nutt, John William**; Scholar of Corpus Christi College, 1852–8; Fellow of All Souls, 1858–75; Sub-Librarian, Bodleian Library, 1867–79; Rector of Shelsfield, 1888.

Hutton, Henry Wollaston; Trinity, B.A. 1857; Prebendary and Succentor of Lincoln Cathedral, 1877–9.

Jackson, Robert Hall; Litton Hall, B.A. 1859; Exeter, M.A. 1866; Rector of Ganarew, co. Monmouth, 1879.

Harcourt, Augustus George Vernon; Balliol, B.A. 1858; Senior Student of Christ Church, 1859; Lee's Reader in Chemistry, 1871–1902; F.R.S.; President of Chemical Society; General Secretary, British Association, 1883–97.

Leeds, Edward; Wadham, B.A. 1859; B.Med. 1863.

April. **Dowling, Thomas**; Wadham, M.A. 1862; General Licence, Diocese Bath and Wells; Weston-super-Mare.

Lewis, George; Jesus, Clerk; B.A. 1860; Medical Student, 1857.

Oct. **Norsworthy, George**; B.A. 1861; Barrister-at-Law, Inner Temple, 1866.

Steward, Charles Edward; Demy, 1856–61; Perpetual Curate of Churt, Surrey, and of St. Peter's, Southampton, 1869.

Saunders, William; Magdalen Hall, matriculated, 1851, aged 38.

Whinfield, Edward Henry; Demy; I.C.S. 1858; Barrister-at-Law, Middle Temple, 1872.

1857. Feb. **Jordan, Gibbes Walker**; matriculated at St. Alban Hall, 1856; B.A. Magdalen College, 1860.

Rivington, Luke; Demy, 1856–62; of the Society of St. John the Evangelist, Cowley; seceded to Rome; †.

May. **Spry, Edward George**; Magdalen Hall, B.A. 1857; †1887.

Plumptre, Charles John; University, B.A. 1858; High Sheriff of Kent, 1877; †1887.

Oct. **Alington, John Wynford**; Demy, 1857–63; B.A. 1861; M.A. 1865; †Transvaal, 1879.

Ostler, John Mountney; Demy, 1857–63; now **Lely**; Barrister-at-Law, Inner Temple, 1869.

Westmacott, Edward Vesey; Demy, 1857–63; Bengal Civil Service, 1861.

Arnould, Alfred Henry; B.A. 1861; D.C.L. 1875.

Oldham, Ernest Joseph; B.A. from Magdalen Hall, 1862.

Crawhall, Septimus Isaac; B.A. 1862; Vicar of Stratton, Wilts., 1879.

Stanhope, Philip John Scudamore; B.A. 1863; Rector of Humber, co. Hereford; †1882.

Portman, Henry Fitzhardinge Berkeley; B.A. 1863; Rector of Pylle, Somerset, and of Orchard Portman.

1858. Feb. **Morres, Hugh Redmond**; Chorister, 1849–55; Vicar of St. Sebastian, Wokingham, 1871–†82.

Tuckwell, Lewis Stacey; Chorister, 1847–57; Clerk, 1857–63; Chaplain and Precentor, 1866–77; Vicar of Standlake, Oxon., 1876.

Berners, Hugh Augustus; B.A. 1863; Rector of Harkstead, Suffolk, 1865.

Barne, George Hurley; B.A. 1861; Student of Lincoln's Inn, 1863.

Middleton, Hastings Burton; Demy, 1857–62; J.P., Dorset, 1867.

Nov. **Ley, William Clement**; Demy, 1857–64; Rector of Little Ashby, co. Leicester; Vice-President of the Meteorological Society; †.

Evans, Francis Stone; M.A. 1865.

Mackenzie, William Dalziel; B.A. 1862; Barrister-at-Law, Inner Temple, 1863; High Sheriff, Oxon., 1873; Fawley Court, Oxon.

1859. Feb. **Dering, George Edwardes**; B.A. 1863; Recorder of Faversham, 1872; Assessor of Romney.

Howard, Charles Francis Arnold; fifth **Earl of Wicklow**; †1881.

Melville, Robert; B.A. 1861; Barrister-at-Law, Lincoln's Inn, 1864.

May. **Wylde, John**; Demy, 1858–63; Vicar of St. Saviour's, Leeds, 1877.

Wigram, Ernest; Demy, 1859–64; Vicar of Whitby, 1873–5; †1876.

Oct. **Prince, Edward Becher**; B.A. 1862; Vicar of Cockington, Devon, 1879–82.

Cameron, George Hampden; B.A. 1864.

Earle, Alfred; M.A. 1866; Rector of Fovant, Salisbury, 1890.

Burrows, Robert Henry; Demy, 1859; I Cl. Mod. 1861.

Gilbert, Herbert Henry; B.A. 1863.

Esson, William; St. John's, Bible Clerk, 1855; Senior Mathematical Scholar and Fellow of Merton, 1860; Mathematical Lecturer, Magdalen; F.R.S., F.C.S., F.R.A.S.; Savilian Professor of Geometry; Fellow of New College, 1897.

Bedwell, Francis; Exhibitioner of Corpus Christi College, 1856–60; Vicar of Llangattock-juxta-Caerleon, co. Monmouth, 1885.

Leith, William Forbes; Worcester, B.A. 1859; Vicar of Wattisham, Suffolk, 1868.

Taylor, F.

Daubeny, Edmund Thomas; B.A. 1864; Rector of Market Weston, Norfolk.

Chamberlayne, Tankerville; B.A. 1865; of Cranbury Park and Weston Grove, Hants; M.P. for Southampton, 1892–6.

Gray, Edmund Robert Henry; matriculated, 1859.

Whitwell, John Maude; Pembroke, B.A. 1861; †1868.

1860. Feb. **Bateman, Rowland**; M.A. 1867; C.M.S. Missionary in India, 1868–1902; Rector of Fawley, near Henley-on-Thames, 1902.

Hay, Frederic Drummond; B.A. 1863; Incumbent of St. John's, Inverness, 1886–91; Vicar of Neston, Wilts, 1891–96.

Daubeney, Giles Barnston; matriculated, 1859; †1879.

Greene, Thomas Whitcombe; B.A. 1864; Inspector of Schools, 1876.

Apr. **Gamble, John George**; Demy, 1859–64; B.A. 1864; of the Middle Temple, 1863; †.

Russell, James Cholmeley; B.A. 1864; Barrister-at-Law, Lincoln's Inn, 1867.

Edwards, Sir Henry; matriculated, 1859; second **Baronet**; J.P., Yorks.

Oct. **Bulley, John Francis**; Demy, 1859–64; Barrister-at-Law, Inner Temple, 1868.

Jones, John Hampson; matriculated, 1860; Barrister-at-Law, Inner Temple, 1865.

Kirkwood, Townsend Molloy; matriculated, 1860; Bengal Civil Service.

Toye, Arlingham James; Exhibitioner, 1859–64; First Daubeny Medallist, 1860; M.A. 1868; Assistant Master, Winchester College; †.

Barber, Edward; Demy, 1860; Canon and Archdeacon of Chester, 1886.

1861. Jan. **Michell, Edward Blair**; Demy, 1860–5; Law Lecturer at Hertford College, 1874–7; Legal Adviser to King of Siam, 1885.

May. **Henry, Thomas Allan**; B.A. 1864; Captain 14th Hussars; J.P., Leicestershire.

Monck, William Berkeley; B.A. 1865; Barrister-at-Law, Inner Temple, 1868.

Oct. **Corfield, William Henry**; Demy, 1861; Fellow of Pembroke, 1865–76; D.Med. 1872; Professor of Hygiene and Public Health at University College, London; †Aug. 26, 1903.

Girdlestone, Arthur Gilbert; Demy, 1861–6; I Nat. Sci.; lectured for Dr. Daubeny, 1867; Vicar of All Saints, Clapham Park, 1877.

Welby, Philip James Earle; B.A. 1866; Rector of Stroxton, co. Lincoln, 1868–†73.

Handley, Edward; B.A. 1865; Rector of Clipsham, Rutland, 1876–84; of Wenthorpe, 1886.

Tetley, James George; B.A. 1864; Perpetual Curate of Highnam, co. Gloucester, 1876; Canon of Bristol.

1862. Jan. **Ogle, Harman Chaloner**; Demy, 1861–5; Fellow, 1865–†87; Schoolmaster, 1876–86.

Boyle, William Skinner; B.A. 1866; Vicar of St. Luke's, Torquay, 1874; Prebendary of Exeter, 1894.

Daman, Henry; Demy, 1861; Fellow, 1868–79; Assistant Master at Eton College, 1869–99; Vicar of Moulsford, 1899.

Sampson, Desmond Henry Wynn; Exhibitioner, 1861–6; Head Master of Market Bosworth Grammar School, 1883.

Worsley, Edward; Exhibitioner, 1861–6; Fellow, 1867–72; Vicar of Evenley, Northants, 1871.

Milward, George; matriculated, 1861; J.P. of Gloucester, Worcester, and Oxon.

Lawrence, Anthony Cocks; B.A. 1865; Rector of Whittington, co. Gloucester, 1868.

Meek, Alexander Grant; B.A. 1865.

May. **Grissell, Francis de la Garde**; matriculated, 1861; Captain 9th Lancers.

Oct. **Bellairs, Frederick John Walford**; B.A. 1865; Orders.

Lambert, Greville Henry; B.A. 1866; Rector of Emmington, Oxon., 1872.

Anstice, Robert Henry; M.A. 1869.

Powell, Edward; Demy, 1862–5; Scholar of Lincoln, 1865–6.

Parkinson, Robert John Hinman; B.A. 1866; Barrister-at-Law, Inner Temple, 1873.

Warner, John Lee; Demy, 1862–4; I.C.S. 1863.

Masters, William Caldwell; B.A. 1865; Rector of Stanton Fitzwarren, Wilts., 1885.

Kaye, Arthur; B.A. 1866; Vicar of St. Paul's, Middlesborough, 1875–84; Vicar of Selborne, Hants, 1894.

1863. Parsons, Hector Laurence; B.A. 1866.

Jan. **Bulteel, Courtenay John**; Demy, 1862; B.A. 1867.

Johnson, Frederick Philipps; Demy, 1862–7; †1875.

Wakefield, Charles Carthew; Exhibitioner, 1862–7; Head Master of Nassau Grammar School, Bahamas, 1873–80.

Apr. **Knight, Montagu George**; B.A. 1867.

Russell, Robert Bruce; B.A. 1867; Barrister-at-Law, Inner Temple, 1871.

Hyndman, Hugh Reginald; matriculated, 1863.

Parker, Anthony; matriculated, 1863.

Philpott, William; Clerk, 1863–6.

Richardson, Arthur John; Demy, 1862–7; Rector of East Blatchington, Sussex, 1880; Rural Dean of Pevensey, 1890.

Collins, Clifton Wilbraham; Demy, 1862; M.A. 1871; Inspector of Schools.

Girdlestone, Frederick Kennedy Wilson; Demy, 1862–7; M.A. 1873; Barrister-at-Law, Middle Temple, 1885.

Moullin, William Hilary (Balliol); Wadham, B.A. 1867; Barrister-at-Law, Lincoln's Inn, 1868.

Oct. **Moir, Robert William**; matriculated, 1863.

Charrington, Percy William; matriculated, 1863.

Clarke, Joseph George; Exhibitioner, 1862.

Bateman, Arthur Wigley; Demy, 1863–8; B.A. 1867; of the Middle Temple, 1864.

Wilkinson, John Henry; Demy, 1863–8; B.A. 1870; Master of St. Paul's School, Stony Stratford, 1871–2.

Peile, Walter Octavius; Demy, 1863–8; B.A. 1867; Chaplain of Bromley College, 1884–90; Rector of Candlesby, 1896–1902.

1864. Jan. **Martyn, Thomas Waddon**; Demy, 1863–8; Vicar of Aston Abbots, 1887.

Cundey, John Worsley; Demy, 1863; I Math. 1867; Principal of Bolton Educational Institute, 1870–87; Honorary Canon of Manchester, 1901; Rector of Gorton, 1902.

Cox, Cecil Walker; Exhibitioner, 1863; B.A. 1867; Rector of Atherstone, co. Warwick, 1871.

Palmer, Greville Horsley; B.A. 1868; Master of the Mercers' Company, 1889.

Oct. **Parsons, Frederick William**; Demy, 1863–8; B.A. 1869; Rector of Tatsfield, Kent, 1884.

Reid, Robert Threshie; Demy; Scholar of Balliol, 1864–9; B.A. 1869; Q.C. 1882; M.P., Hereford, 1880–5, Dumfries district, 1886; Attorney-General; G.C.M.G.

Wilmot, Darwin; Demy, 1864–9; B.A. 1868; Head Master of Macclesfield Grammar School, 1876.

Horner, Henry Bury; Demy, 1864–9; B.A. 1869; Master of Marlborough; †in Florence.

Williams, John Herbert; Demy, 1864–9; B.A. 1870.

Donkin, William Frederick; Demy, 1864; B.A. 1868; Lecturer in Natural Science, Keble College, 1875–7; and Tutor, 1877–80; lost with Fox in August 1888, apparently in trying to ascend Dych-tau in the Caucasus.

Twyford, Thomas; Exhibitioner, 1863–8; B.A. 1869.

Darnell, Robert de Mowbray; matriculated, 1864.

Sibthorp, Coningsby Charles Waldo; B.A. 1868; High Sheriff of Herts, 1877.

Walton, Oriel Farnell; B.A. 1868; Barrister-at-Law, Inner Temple, 1870.

Frere, William John; Demy, 1863–8; B.A. 1868; Vicar of St. Mary, Wolverhampton, 1874–82; Chaplain of Hockerill Training College, 1884; Vicar of Stanway, Essex.

Powles, George le Blanc; Demy, 1863–8; M.A. 1874.

Swire, John; Clerk, 1864–8; B.A. 1869; Rector of Peasemore, Berks., 1881–1902.

1865. Feb. **Bull, Cyril John Spier**; B.A. 1868; of the Inner Temple, 1869.

Everett, Thomas Marsh; Academical Clerk; B.A. 1870; Vicar of Ruislip, Middlesex, 1878; †.

Oct. **Gamble, James Sykes**; Demy, 1864–9; M.A. 1877; C.I.E. 1899; F.R.S., F.L.S.; late Conservator of Forests in India, and Director of the Imperial Forest School, Dehra Dun.

Campbell, John Arthur Kenneth; M.A. 1872.

Haggard, William Henry Doveton; matriculated, 1865; Diplomatic Service, 1869; Minister Resident at Caraccas, 1897; C.B.

Robinson, William Grey; B.A. 1868.

Eaton, William Cheetham; matriculated, 1865; M.A. 1872.

Bird, Francis Corrie Wilberforce; B.C.L. and M.A. 1872.

Scott, Samuel Gilbert; Demy, 1865–70; B.A. 1870; Rector of Woolwich, 1883–92; Rector of Havant, 1892.

Baker, George Edward; Demy, 1865–70; B.A. 1870; Fellow, 1870; Barrister-at-Law, Inner Temple, 1870; Estates Bursar.

Fletcher, Philip; Demy, 1865; B.A. 1870.

Heal, Francis; Demy, 1865–70; B.A. 1870; Barrister-at-Law, Inner Temple, 1872.

Stirling, Arthur Frederick Gresley; Demy, 1865–70; B.A. 1870; Barrister-at-Law, Inner Temple, 1872.

1866. Feb. **Haly, Henry John Canton**; matriculated, 1866; later of Magdalen Hall; of the Inner Temple, 1872.

Apr. **Tunnard, John Bartholomew**; matriculated, 1866.

Bazalgette, Charles Norman; M.A. 1879; Barrister-at-Law, Inner Temple, 1874.

Oct. **Hicks, Frederic John**; Demy, 1866; Daubeny Medallist, 1863; I Nat. Sci. 1869; B.Med. 1880; M.R.C.S. Lond.

1879; late Resident Medical Officer, Consumption Hospital, Brompton; late Consulting Surgeon to Seamen's Hospital, Funchal, Madeira; Buckingham Gate, London, 1903.

Amcotts, Edward Weston Cracroft; B.A. 1870; J.P., D.L., Lincoln; adopted surname of **Cracroft** in 1885.

Wilson, Roderick John; B.A. 1870; Barrister-at Law, Inner Temple, 1872; †1881.

Brock, William; Demy, 1866; Orders; †1879.

Steward, Arthur Bennett; Demy, 1866–71; I.C.S.; Postmaster-General, Bombay, 1884.

Muir, Robert James; Science Demy, 1866–71; Inspector of Schools, Scotland, 1879.

Bradshaw, James Dixon; Demy; II Nat. Sci. 1870; B.Med. 1877; M.R.C.S. Lond.; late Resident Medical Officer, Cheadle Convalescent Hospital, and Assistant Physician, Manchester Royal Infirmary.

Strutt, Hon. Richard; Magdalen Hall, matriculated, 1866; M.A. from Hertford, 1875.

1867. **Paulson, William Henry**; Demy, 1866–71; B.A. 1871.

Jan. **Clarke, William Alexander**; Demy, 1866–71; B.A. 1871.

Cosser, Walter Wilson Leroux; Exhibitioner, 1866; Barrister-at-Law, Lincoln's Inn, 1875.

Berry, Digby Marsh; M.A. 1876; Chaplain of St. James's Cathedral, Mauritius, 1880.

Devas, William Frederick; M.A. 1878.

May. **Massingberd, William Oswald**; B.A. 1871; Rector of South Ormsby, co. Lincoln, 1873.

Thomas, Richard Gerard de Visme; matriculated, 1867; Barrister-at-Law, Inner Temple, 1875.

Oct. **Brown, George Thomas Gilpin**; matriculated, 1867.

Butler, Charles Stokes; Demy, 1867; Head Master of Archbishop Holgate's Grammar School, Hemsworth, Yorks., 1878.

Allen, William Dennis; Demy, 1867; Fellow and Tutor, 1871–81; Vicar of Findon, Sussex, 1881.

Pitcairn, David Lee; Demy, 1867–72; Vicar of Monkton Combe, Somerset, 1883.

Southey, Henry Edmund; Demy, 1867–72.

Edmundson, George; Demy, 1867; I Math. Mod. 1869;

I Math. 1870; Fellow and Tutor of Brasenose, 1871–81; Vicar of Northolt, Middlesex, 1881.

Sherwood, William Edward; entered Magdalen College School, 1862; Daubeny Medallist in Natural Science, 1868; Junior Student of Christ Church, 1870–5; Chaplain, Bath College, 1881; Head Master, Magdalen College School, 1888.

Warham, —; Magdalen College School.

? **Dudley, Francis**; St. Alban Hall; B.A. 1869; Vicar of Wrenthorpe, Yorks, 1876–83.

[*End of the 8vo Lecture List.*]

Dr. Daubeny died in December of this year.

[**Mr. Edward Chapman** of Merton College was appointed Lecturer in Natural Science in 1869.]

1869. **Billing, Campbell Pymar**; Demy, 1868; Daubeny Medallist in Natural Science, 1866; †1871.

Goolden, Walter Thomas; Academical Clerk; I Nat. Sci. 1871; Chorister; Daubeny Medallist, 1865; Jackson Scholar, Merton, 1867; †Sept. 16, 1901.

Valpy, Frederic Harris; Pass School; B.A. 1873; Domestic Chaplain to the Earl of Scarborough, 1886–97; Rector of Faulkborn, Witham, Essex.

Howell, Frederick Broke; Merton; II Nat. Sci. 1869; M.A. 1871; Vicar of Charlton, Wilts., 1883.

Taylor, Charles Samuel; Merton; I Nat. Sci. 1870; Burdett-Coutts Scholar, 1871; Vicar of St. Thomas-the-Martyr, Bristol, 1877.

Macdonald, Archibald Simon Lang; Exhibitioner of Merton, 1868; Fellow, 1873–85; Millard Lecturer in Physics, Trinity, 1873–6; †1885.

Childs, Christopher; Jackson Scholar of Merton, B.Med. 1878; D.Med. 1887; D.P.H. Camb. 1895; Lecturer on Bacteriology in relation to Hygiene, University College, London; Surgeon, Weymouth and Dorset Royal Eye Hospital.

Lewis, William James; Scholar of Jesus, 1865–9; I Math.

Mod. 1867; I Math. 1868; I Nat. Sci. 1869; Fellow of Oriel, 1869; Sen. Math. Scholar, 1871; M.A. 1872; Professor of Mineralogy at Cambridge, 1881.

Hake, George Gordon; Jesus, matriculated, 1867.

Sharkey, Seymour John; Scholar of Jesus, 1866–71; B.Med. 1875; D.Med. 1888; F.R.C.P. Lond. 1885; Gulstonian Lecturer, 1886; Physician, St. Thomas's Hospital; Radcliffe Travelling Fellow, 1873.

Tanner, Henry William Lloyd; Scholar of Jesus, 1868–73; B.A. and M.A. 1875; Professor of Mathematics and Astronomy in the University College of S. Wales; D.Sc., F.R.S., F.R.A.S.

Fowler, William Weekes; Scholar of Jesus, 1868; B.A. 1873; Head Master of Lincoln School, 1880.

Hatton, James Wright; Wadham, B.A. 1872; M.A. 1873; Vicar of Calverley, Yorks., 1877.

Blencowe, Charles Edward; Wadham, B.A. 1870; M.A. 1873; Vicar of Marston St. Lawrence, Northants, 1876.

Johnson, John Barnes; Wadham, B.A. 1870; M.A. 1875.

Lendon, Edwin Harding; Gunsley Exhibitioner of University College; I Nat. Sci. 1870; B.Med. and M.A. 1876.

Yule, Charles John Francis; Brackenbury Scholar of Balliol, 1867; Daubeny Medallist, 1867; Scholar of St. John's, Cambridge, 1868; I Nat. Sci. Tripos, 1872; Fellow of Magdalen, 1873; Vicar of Ashbury, Berks., 1892–1900.

Malan, Arthur Noel; Oriel; B.A. 1872; Orders; Head Master of Eagle House School, Wimbledon, 1874.

Hardy, Charles Robert William; Scholar of Oriel, 1865–69; II Cl. Mod. 1867; B.A. 1870; Vicar of Offley, 1885.

Woodforde, Francis Cardew; Exeter, B.A. 1869.

Treacher, William Hood; Dyke Scholar of St. Mary Hall, 1866–70; M.A. 1881.

Jacob, Ernest Henry; Corpus Christi College, II Cl. Mod. 1869; I Nat. Sci. 1871; B.Med. and M.A. 1875; D.Med. 1880.

Jowitt, John Fort; Exeter, I Nat. Sci. 1869.

Fisher, Walter William; Postmaster of Merton; I Nat. Sci. 1870; IV Cl. 1871; Fellow of Corpus Christi College, 1871; Aldrichian Demonstrator of Chemistry,

1873; Public Analyst, Berks., Bucks and Oxon.; Natural Science Examiner, 1877–8, 1890–1.

Wharton, Henry Thornton; Wadham, III Nat. Sci. 1871; M.A. 1874.

Browne, Frederick Herbert; Scholar of Wadham, 1868; I Math. Mod. 1869; II Math. 1871; M.A. 1874; Head Master of Ipswich School, 1883.

Baynes, Robert Edward; Wadham, I Math. Mod. 1870; I Math. 1871; I Nat. Sci. 1872; Senior Student of Christ Church; Lee's Reader in Physics; Proctor, 1886.

Kay, John Cunliffe; Wadham, S.C.L. and B.A. 1872; M.A. 1875.

Roberts, Edwin; Exhibitioner; II Math. Mod. 1871; B.A. 1872; Head Master, Alford Grammar School; Rector of Swaby, Lincs., 1896.

Hill, Arthur du Boulay; Demy, I Nat. Sci. 1873; Science Master, Winchester College, 1874–82; Chaplain, Winchester College, 1881–2; Rector of East Bridgford, Notts, 1898.

Dynham, John; B.A. 1877; Chorister, 1857.

Ballachey, Frederick Gurney; Wadham, matriculated, 1866.

Wilkinson, John Frome; Wadham, II Theol. 1873; F.L.S., F.S.A.; Rector of Kilvington, Notts, 1887–94.

Randall, William Sidney; Wadham; B.A. from Hertford, 1875; Chaplain to the Forces, 1882.

Davies, Thomas Davidson; Jesus College until 1872.

Phillips, Walter Hibbert; Jesus, II Nat. Sci. 1873; M.A. 1878.

1870. **Poole, William Harry Wilkes**; Exhibitioner, 1870–5; I Nat. Sci. 1874; B.A. 1874; M.A. 1877; Science Master, Charterhouse; †Feb. 1890.

Mahony, Pierce Charles de Lacey; Assistant Land Commissioner, 1881–4; M.P. for North Meath, 1886–92; Grange Con, co. Wicklow.

Moberly, Edward Hugh; Corpus Christi College, II Theol. 1872; M.A. 1875; Vicar of Chute, Wilts., 1880–5.

Robertson, Edward Lewis; Demy, 1869–73.

Butt, Walter William Arthur; B.A. 1873; Vicar of Minety, Wilts., 1886–1901; Licenced Preacher in Diocese of Gloucester from 1901.

Stancomb, William; B.A. 1872; S.C.L. Student, Inner Temple.

Neville, William; Academical Clerk; B.A. 1873; Vicar of St. Mary, Reading, 1897.

Chaplin, Thomas Hanby; B.A. 1873; †1876.

Smallpeice, Frank Freshfield; Pass School; B.A. 1872; Curate of St. Bartholomew, Brighton, 1897.

Ellis-Jervoise, Arthur Tristram; Magdalen Hall, matriculated, 1868; Pass School.

1871. **Faber, Henry Mitford**; Demy; I Nat. Sci. 1874; Science Master, Malvern College, since 1875; Orders, 1886.

Evans, —; Jesus. [Four of this name were up in 1871.]

1872. **Ridley, Stuart Oliver**; Magdalen; elected Nat. Sci. Scholar of Exeter, 1873–7; I Nat. Sci. 1875; Assistant in British Museum, 1878; Vicar of Staverton, Trowbridge, 1898.

Denton, George Henry; Wadham, B.A. 1873.

Clarke, Arthur Noble; Wadham, IV. Nat. Sci. 1874; B.A. 1875; M.A. 1877.

Greenough, John Knox Montgomery; Wadham, matriculated, 1870.

Kitson, George Andrew Noble; Keble, matriculated, 1870.

Pitcairn, David Lee; Demy; I Mod. 1869; II Cl., B.A. 1871; Vicar of Monkton-Combe, Bath, 1883.

Brackenbury, Arthur Charles; matriculated, 1871; †1873.

Anderson, Charles Archibald; matric. 1870; B.A. from St. Alban Hall, 1876.

Willoughby, Hon. Leopold Vincent Harold; B.A. 1875.

Middleton, William Frederick; B.A. 1874.

Wood, William Jocelyn Palmer; III Nat. Sci. 1876; †1883.

Turnor, Charles Edward; †Sept. 16, 1875.

Christie, George Robert; Nat. Sci. Demy; I Math. Mod. 1874; II Math. 1875; I Nat. Sci. 1877; M.A. 1879.

Steel, Robert Elliot; Demy; III Math. Mod. 1874; I Nat. Sci. 1876; Senior Science Master, Bradford Grammar School, ten and a half years; Head Master, Technical Schools, Plymouth; Head Master of Northampton and County School since 1895.

Wade, Claude Fitzroy; Exhibitioner, 1868–73; B.A. 1873; Barrister-at-Law, Middle Temple, 1874.

Woodd, Lawrence Henry Orde; B.A. 1874; Student of Inner Temple, 1873; †1879.

Knox, Frederick Vivian; Classical Demy; II Mod. 1872; II Nat. Sci. 1874; Assistant Master, Merchant Taylors' School, 1875–82; Chaplain (Eccles. Est.) at Umballa, 1882–86; Chaplain, C.M.S. Children's Home, Limpsfield, Surrey, 1886–99.

1873. **Jones, William Wansbrough**; Demy; I Nat. Sci. 1876; B.Med.; M.R.C.S. Lond.; Radcliffe Travelling Fellow, 1880; I B.Sc. Lond.; Open Scholar, St. Thomas's Hospital; Resident Medical Officer, Barnes Convalescent Hospital, Manchester.

Poulton, Edward Bagnall; Scholar of Jesus, 1873–8; Fellow; I Nat. Sci. 1876; Burdett-Coutts Scholar, 1878; Tutor, Keble, 1882; Hope Professor of Zoology, 1893; F.R.S.

1874. **Bell, Francis Jeffrey**; Exhibitioner, 1874–8; II Nat. Sci. 1877; M.A. 1880; Emeritus Professor of Comparative Anatomy, King's College, London; Assistant, Zoological Department, British Museum; Natural Science Examiner, 1892–3.

Kermode, Robert Crellin; Wadham, matriculated, 1873.

Jones, Griffith; Scholar of Jesus, 1872–6; I Nat. Sci.; B.A. 1875; M.A. 1878.

Francis, Lloyd; Scholar of Jesus, 1872; B.A. 1875; B.Med. 1881; M.A. and D.Med. 1885.

Greswell, Dan Astley; Junior Student of Christ Church, 1872–7; B.A. 1875; B.Med. 1881.

Coates, George; Scholar of Balliol, 1870–4; B.Med. and M.A. 1878; D.Med. 1886.

Scarth, Leveson Edward; St. John's, B.A. 1874, M.A. 1877.

Wade, Charles Henry; Demy, 1872–7; II Nat. Sci. 1877; B.A. from Charsley Hall, 1880; M.R.C.S.; L.R.C.P.; D.P.H. 1891; F.L.S.

Schofield, Robert Harold Ainsworth; Scholar of Lincoln, 1870–4; B.Med. 1877; Radcliffe Travelling Fellow, 1876; †in China, 1883.

Wright, George Arthur; Non-Collegiate, B.A. 1874; B.Med. 1877.

1875. **Rees, George Edward**; Scholar of Jesus, 1872–7; M.A. 1879; Rector of Bagendon, co. Gloucester, 1881.

Price, Hugh Brocas; Demy.

Robinson, Henry Halliburton; Demy; III Math. Mod. 1877; I Nat. Sci. 1879.

Stubbs, Thomas Walker; Demy, 1875; resigned Demyship in 1878 through marriage; †.

Wilson, Herbert Amyot Brereton; Chorister, 1867–73; Exhibitioner, 1875–6; †a missionary at Zanzibar, 1882.

Oliver, Sydney James; matriculated, 1874.

Falls, William Coulthard; Merton, B.A. 1877; B.Med. and M.A. 1881.

Evans, Owen; Scholar of Jesus, 1874–7; M.A. 1886; Chaplain to Bishop of Chester; Warden of Llandovery College, 1889.

Evans, William Franklin; Scholar of Jesus, B.A. 1877; M.A. 1880.

Armitage, Joseph; New College, B.A. 1876; B.Med. and M.A. 1880.

Williamson, Robert Isherwood; Junior Student of Christ Church, 1871–6; M.A. 1878; B.Med. 1879; Radcliffe Travelling Fellow, 1879; †at Florence, 1882.

Benson, Alfred; Exhibitioner, Queen's, 1872–6; B.Med. and M.A. 1880.

Acland, Theodore Dyke; Christ Church, B.A. 1874; M.D. 1883; Physician, St. Thomas's Hospital.

Hoare, Arthur Fanshawe; Scholar of Balliol, 1873–7; B.A. 1878; M.A. 1883; Assistant Master at Haileybury College.

1876. **Colenso, Robert John**; Trinity, B.A. and M.A. 1877; B.Med. 1879.

Solly, George Edward; Group C; B.A. 1877; M.A. 1880.

Dixey, Frederick Augustus; Scholar of Wadham, 1874–8; III Cl. Mod. 1876; III Nat. Sci. 1878; B.Med. 1884; Fellow, 1885; D.Med. 1891; Demonstrator in Physiology.

Fox, Bonville Bradley; Christ Church, B.A. 1874; B.Med. and M.A. 1879; D.Med. 1882.

Maitland, Hugh Fuller; Group C; B.A. 1881.

How, Henry Walsham; Wadham, M.A. 1881; Vicar of St. Mary, Mirfield, Normanton, 1889.

Capell, James Partridge; Wadham, M.A. 1881.

Jupp, Herbert Basil; Mathematical Demy; III Math. Mod. 1874; II Math. 1876; II Nat. Sci. 1877; Science Master, Clifton College; †.

Gridley, Arthur Robert; Scholar of Wadham, 1874–8; B.A. and M.A. 1881; of the Inner Temple, 1877.

Jackson, Arthur Percy; Non-Collegiate, 1876; Magdalen, 1877–8.

Broadbent, George; Demy; II Cl. Mod. 1877; I Nat. Sci. 1880; Solicitor, 1884.

Anderson, Alfred Jasper; Demy; II Math. Mod. 1877; I Nat. Sci. 1878; M.A. and B.Med. 1883; M.R.C.S. Lond. 1882; D.P.H. Camb. 1888; Radcliffe Travelling Fellow, 1881; Medical Officer of Health, Cape Town; late of Blackpool.

Bulley, Frederic Pocock; B.A. 1880; Home Bursar, Magdalen College, 1884–97; of Marston Hill, near Fairford.

Blomfield, James Edward; Demy; I Nat. Sci. 1879; B.A. 1879; Radcliffe Travelling Fellow, 1884; B.Med. 1890; sometime Resident Medical Officer, Hertford British Hospital, Paris; Sevenoaks, Kent.

Saunders, Alfred Hugh; Jesus, B.A. 1879; M.A. 1883 (Orders).

Williams, Thomas; Scholar of Jesus, 1874–9; M.A. 1881.

Davies, —; Jesus. [Identification uncertain.]

Jenkins, Edward Johnston; Trinity, B.A. 1878; B.Med. 1882; D.Med. 1885.

1877. Hanham, Sir John Alexander, Baronet; Group C; B.A. 1878; Barrister-at-Law, Inner Temple, 1881; Apparitor-General for the Province of Canterbury.

Ryle, Reginald John; Trinity, B.A. 1877; B.Med. and M.A. 1884; D.Med. 1894; Assistant Surgeon, Sussex Eye Hospital, Brighton.

? **Pearce-Brown, Reginald**; Trinity.

Smith-Chatterton, Sinclair Dickson; Trinity, B.A. 1877.

Dugdale, James Broughton; Trinity, M.A. 1883; of Wroxall Abbey, co. Warwick.

Brook, Charles Lewis; Trinity, B.A. 1878.

Jelly, James Osborne; Mathematical Demy; I Math. Mod.

1876; I Math. 1878; II Nat. Sci. 1880; Master at Grammar School, Middleton, Manchester; †.

Cave, Arthur Wilson; Mathematical Demy; Prelim. Chem.; I Math. Mod. 1876; I Math. 1878; B.A. 1878; Head Master of Oxford High School for Boys; formerly Lecturer in Natural Science at St. Thomas's College, Colombo, Ceylon.

Williams, William; Scholar of Jesus, 1877–82; B.Med. and M.A. 1887.

Jones, Edmund Osborne; Postmaster of Merton, 1876–81; M.A. 1883; Vicar of Llanidloes, Montgoms., 1891.

1878. **Jackson, Raynsford Valentine**; Demy; I Nat. Sci. 1881.

Walker, Archibald; Trinity, M.A. 1886; of Glasgow.

Woollcombe, Walter George; Trinity, B.A. 1880; M.A. 1883.

Nias, Joseph Baldwin; Scholar of Exeter, 1876–9; I Nat. Sci. 1878; Burdett-Coutts Scholar, 1881; Radcliffe Travelling Fellowship, 1882; B.Med. 1883.

Hawker, George Loraine; Exhibitioner of Exeter, 1875–8; B.A. 1878; Solicitor, 1881.

Peck, Robert Holman; Scholar of Exeter, 1875–8; M.A. 1882; B.Med. 1884.

Power, D'Arcy; Exhibitioner of Exeter, 1876–8; B.Med. 1882; Assistant Surgeon, St. Bartholomew's Hospital.

Davy, Thomas George; Exeter, B.A. 1880.

Flaxman, Americ Edwin; Junior Student of Christ Church, 1874–9; B.A. 1878.

Ridley, Henry Nicholas; Exeter, B.A. 1878; M.A. 1881; Director of the Botanical Gardens, Singapore, 1888.

Davies, Sidney; Scholar of Exeter, 1874; B.A. 1877; B.Med. and M.A. 1883; D.Med. 1889; late Principal Medical Officer, Egyptian Police; Medical Officer of Health, Woolwich.

Ellison, William Augustine; University, B.A. 1879; B.Med. 1884.

Willett, Edgar William; New College, B.A. 1879; B.Med. 1885.

Ward, Richard Moody; Exhibitioner of Exeter, 1875–80; B.Med. 1885.

Rosenstock, Rudolph; St. Edmund Hall, B.A. 1882.

Zoete, Charles Septimus de; Merton, B.A. 1880; M.A. 1883.

Heyes, John Frederick; I Nat. Sci. 1881; late Senior Science Master, Christ College, Brecon; F.R.G.S.; Vicar of St. Barnabas, Bolton-le-Moors, Lancs, 1900.

Turnbull, George Lindsay; Nat. Sci. Demy, who read Mathematics; II Math. Mod. 1880; I Math. 1882; B.Med. 1887; D.Med. 1892; of Ladbroke Grove, London.

Chitty, John Shaw Willes; Demy; resigned his Demyship on ground of ill-health in 1880; †.

Haines, William Francis; Jesus, B.A. 1885.

1879. **McRae, Charles**; Scholar of Exeter, 1875–80; B.A. 1879; M.A. 1883.

Whittaker, Thomas; Scholar of Exeter, 1877–81; B.A. 1881.

Beddard, Frank Evers; New College, B.A. 1880; M.A. 1883; Prosector, Zoological Society; F.R.S.

Smith, Frederick John; Scholar of Balliol, 1875–80; B.Med. 1885; D.Med. 1891; Radcliffe Travelling Fellow, 1885; Lecturer on Forensic Medicine, London Hospital.

Jackson, Arthur Molineux; Non-Collegiate, 1878; Queen's, B.A. 1880; B.Med. 1884; D.Med. 1891; Medical Superintendent, Notts County Asylum, near Radcliffe-on-Trent.

Milner, Edmund Taylor; Scholar of Merton, 1877–82; B.Med. and M.A. 1886; Surgeon, Salford Royal Hospital.

Thorpe, James Cole; Non-Collegiate, matriculated, 1877; a Commoner of Corpus Christi College, 1880; M.A. 1887.

Hewlett, Charles Edward; Magdalen, Demy, 1876–9; B.A. 1879.

Cholmeley, Henry Patrick; Magdalen, B.A. 1880; B.Med. and M.A. 1886; Assistant Sub-Editor of *The Lancet*.

Scott, William Duncan; Exhibitioner of Balliol, 1877–81; M.A. 1883.

[During Mr. Chapman's absence in Lent Term his pupils were taken by Messrs. Yule, Pike, Lecturer at Merton, and Macdonell, Millard Lecturer.]

Bothamley, Westley; Demy, 1879–83; II Math. Mod. 1880; M.A. 1886; Curate of Emmanuel, Wimbledon, 1890.

[Owing to Dr. Pike resigning his Lectureship at Merton, on going to Toronto, the combination with Merton College came to an end, and Dr. Watts subsequently took men reading Chemistry for the Honour Schools until 1899.]

1880. **Crowdy, Francis Demainbray**; Oriel, B.A. 1881; B.Med. and M.A. 1885; Torquay.

Chalmers, Robert; Scholar of Oriel, 1877; B.A. 1881; Treasury; C.B. 1900.

Stuart, John; Exhibitioner of Balliol, 1877–82; B.A. 1881.

Buckmaster, George Alfred; Demy, 1877; I Nat. Sci. 1881; D.Med. 1887; D.P.H. Oxon. 1887; B.Sc. London; Burdett-Coutts Scholar, 1882; Radcliffe Travelling Fellow, 1883; Lecturer in Physiology and Biology, St. George's Hospital, London; Member of the Indian Leprosy Commission, 1890–1.

Cunningham, Joseph Thomas; Scholar of Balliol, 1877; B.A. 1881; Fellow of University, 1882–9.

Andrewes, Frederick William; Junior Student of Christ Church, 1878–83; Burdett-Coutts Geological Scholar, 1883; Sheppard Fellow of Pembroke, 1886–96; B.Med. and M.A. 1887; D.Med. 1895; Assistant Medical Tutor, St. Bartholomew's Hospital.

Horton, William Pingo; Group C; B.A. 1883; Barrister-at-Law, Inner Temple, 1886.

Daubeney, Arthur Giles; II Nat. Sci.; Assistant Master, Bradfield College, 1885–8; Rector of Ashurst, 1892–6; Vicar of Benenden, Kent, 1897.

Ellis, Robert Kingdon; Demy; III Nat. Sci. 1884; B.Med. 1892; Medical Officer and Public Vaccinator, Lowdham District, Southwell Union, Notts; late House Physician, St. Thomas's Hospital.

Heaton, George; Demy; I Nat. Sci. 1883; B.Med. and B.Ch. 1888; F.R.C.S. Lond. 1891; Senior Laurence Scholar and Gold Medallist, St. Bartholomew's Hospital, 1888; Honorary Surgeon, General Hospital, Birmingham.

Lascelles, Brian Piers; II Nat. Sci. 1882; Science Master, Harrow, 1885–1901; Librarian, Harrow School, since 1888; F.C.S., F.S.A.

1881. **Hawkins, Herbert Pennell**; Scholar of Pembroke, 1879–83; B.A. 1882; F.R.C.P.; D.Med. 1894; Radcliffe

Travelling Fellow, 1886; Lecturer on Medicine, St. Thomas's Hospital.

Waite, Davis Allan; Exeter, B.A. 1881; M.A. 1884.

Hichens, James Harvey; Scholar of Queen's, 1878–83; B.A. 1882.

Scattergood, Bernard Page; Exhibitioner of Queen's, 1881–6.

Colby, James George Ernest; Wadham, B.A. 1882; M.A. 1885.

Evans, John Edwardes; Jesus, B.A. 1882; M.A. 1887; Head Master of Conway College, 1886.

Roxburgh, Alexander Bruce; Exeter, B.A. 1882.

Mackness, George Owen Carr; Junior Student of Christ Church, 1879–84; B.A. 1883.

Dawson, William; Exhibitioner of Exeter, 1878–83.

Lancaster, Ernest le Cronier; Scholar of St. John's, B.A. 1883; B.Med., B.Ch., and M.A. 1887; Lecturer on Biology, Swansea Municipal Schools.

Todd, Robert Henry; Hertford, B.A. 1882.

Hands, Charles Hubert; Non-Collegiate, B.A. 1882; B.Med. 1887; Totland Bay, I.W.

Ord, William Wallis; University, B.A. 1883; B.Med. and M.A. 1887; Physician, Salisbury Infirmary.

Roth, Walter Edmund; Demy, 1880–5; II Nat. Sci. 1884; B.A. 1885; M.R.C.S., L.R.C.P. 1892; Medical Practitioner, Sherwood, and the Northern Protector of Aboriginals, Queensland.

Brodie, Sir Benjamin Vincent Sellon, Bart.; Group C, 1886; M.A. 1889; Barrister-at-Law, 1889; F.S.A.

Johnson, John Tysilio; Demy; II Nat. Sci. 1885; Science Master at Oakham for nine years; Senior Science Master, Durham School; F.C.S.

Prior, George Thurland; Demy; II Math. Mod. 1883; I Chem. 1885; I Physics, 1886; Assistant, Mineral Department, British Museum.

1882. **Ogle, Wilfrid Rathmell**; Trinity, B.A. 1881; M.A. 1884; Vicar of Highgate, 1896.

Jones, Enoch; Jesus, B.A. 1882; Curate of Withycombe Raleigh, Exmouth, Devon.

Gordon, George; New College, B.A. 1885.

Price, William Arthur; Scholar of New College, B.A. 1882.

Brown, Frederic Hewlett; Demy, 1882; I Physiol. 1886; M.D. 1902; first place by examination for Indian Medical Service, 1891; assumed name of **Burton-Brown**; late Regius Professor of Medicine at Lahore; Physician, British Embassy, Rome.

Gossage, Alfred Milne; Demy; I Chem. 1886; B.Med. and B.Ch. 1891; M.R.C.P. 1893; Entrance Scholarship Westminster Hospital, 1888; late House Physician, Consumption Hospital, Brompton.

Hulbert, Henry Harper; Prelim. Phys. and Chem.; B.A. 1884; M.R.C.S. Lond.; late Assistant House Surgeon, St. Thomas's Hospital; Medical Lecturer and Examiner on Voice Production, Ambulance, and Home Nursing, School Board for London.

Savage, Edwin Sidney; Prelim. Chem.; B.A. 1885; matriculated from Magdalen Hall; Rector of Hexham, Northumberland, 1898.

Stovin, Cornelius Frederick; B.A. 1886.

1883. **Kent, Albert Frank Stanley**; II Physiol. 1886; sometime Assistant Demonstrator, Owens College, Manchester; and at the Physiological Department, Oxford; Demonstrator in Physiology at St. Thomas's Hospital, London; Lecturer in Pathology, Bristol.

Abrahall, John Leigh Hoskyns-; Demy; II Math. Mod. 1885; I Chem. 1887; Berkeley Fellow, Owens College, Manchester; †Oct. 12, 1891, aged 26.

Withington, Edward Theodore; Balliol, B.A. 1883.

Bennett, Lawrence Henry; Trinity, B.A. 1884.

Farmer, John Bretland; Demy; I Bot. 1887; Demonstrator to Professor of Botany, Oxford, 1887–92; D.Sc. 1902; Fellow of Magdalen, 1889; Professor of Botany, Royal College of Science, South Kensington; F.R.S., F.L.S.; Natural Science Examiner, 1892–3.

Unwin, William Sully; Prelim. Chem.; B.A. 1886; matriculated from Non-Collegiate Students; Vicar of Ivegill, Carlisle, 1900.

1884. **Girdlestone, Henry**; III Math. Mod. 1883; III Chem. 1886; Master at the College, Bath; Head Master, St. Peter's College, Adelaide.

Hawkins, Charles Caesar; Classical Demy; I Mod.; I Lit. Hum. 1886; Prelim. Sci.

Nicholls, Benjamin Ernest; Prelim. Chem. and Phys.; B.A. 1886.

Hall, Charles Oswin; matriculated, 1883.

Jourdain, Francis Charles Robert; Group C, 1886; B.A. 1887; Vicar of Clifton, Ashbourne, Derbyshire, 1894.

Dempsey, Hugh Paul; Group C, 1886; B.A. 1886; Vicar of Hebden Bridge, Diocese of Wakefield, 1899.

Giles, Robert Sidney; Demy; II Chem. 1888; Science Master, Bromsgrove School.

Harper, Henry Guy; Licentiate in Dental Surgery of the Royal College of Surgeons, England.

Highton, Hugh Percy; Exhibitioner; I Chem. 1888; Science Master, Rugby.

Tollit, Percy Kitto; Demy; I Math. Mod. 1882; I Math. 1885; I Physiol. 1886; late Mathematical Master, Bromsgrove School; Head Master of Derby School, 1898.

1885. Best, Edward Shiffner; Group C, 1886; B.A. 1888; Rector of Ludgershall, Andover, 1899.

Gilliatt, Frederic Hatfeild; Group C, 1886; B.A. 1887.

Holt, Harold Edward Sherwin; Group C, 1886; B.A. 1886.

Lindley, Walter Delmar; Group C, 1886; B.A. 1886; Rector of Elmstone, Kent, 1895.

Pryor, Percival Arthur Leonard; Group C, 1886; B.A. 1887.

Ferguson, Edwin Augustus; B.A. 1887; Rector of Holdenby, Northants, 1900.

Debenham, Frank Bridgewater; Prelim.; B.A. 1888.

Ritchie, David; B.A. 1886.

1886. Charlesworth, Basil Arthur; Group C, 1886; B.A. 1887; Barrister-at-Law, Inner Temple, 1895.

Bird, Douglas Smith; Math. Demy; I Math. Mod. 1885; II Math. 1888; Chem. Prelim.; B.A. 1888; Master of Cheam School; ? Head Master of Arnold House Preparatory School, Llanddulas, North Wales.

Wood, Walter John; Math. Demy; II Math. Mod. 1889; II Math. 1891; B.A. 1891; Master at Tettenham College six years; Bury School, 1901.

Walker, Joseph Cyril; Prelim. Physiol.; B.A. 1889; Curate of Averham, Notts, from 1897.

Frost, Percival Gildart; Prelim. Chem.; Group C; B.A. 1890; Medical Student; †1893.

Partridge, Lionel Stroud; Group C; B.A. 1888; Middlesex Hospital; M.R.C.S., L.R.C.P. Lond.; late House Surgeon of the Royal Bucks Hospital, Aylesbury; Warminster, Wilts.

Bingley, Frederic Sparkes Norman; IV Chem. 1888.

Gardner, John Addyman; Demy; I Chem. 1889; Lecturer in Chemistry, and chemical adviser to the Clinical Department, St. George's Hospital, London; Chemistry Examiner, 1900.

Bennett, Reginald Arthur Renaud; Group C, Chem. and Phys.; B.A. 1886.

1887. **Merry, William Joseph Collings**; II Physiol. 1889; B.Med. and B.Ch. 1893; St. Thomas's Hospital, London; D.Med. 1896; Eastbourne.

Percival, John Guthrie; II Chem. 1889.

Inman, Arnold; Demy; II Chem. 1890; Barrister-at-Law, Inner Temple, 1892.

Young, Walter George; Math. Exhibitioner; Prelim. Phys.; I Math. Mod.; II Math. 1888; Librarian to H.M. the King of the Belgians; Assistant Master at Harrow School.

Chaine, James; Prelim. Phys.; Group C, Chem.

Church, Percy William Palmer.

Tattersall, J. G. William; matriculated, 1885; Prelim. Phys.

Pedder, Arthur Lionel; Math. Demy; I Math. Mod. 1887; I Math. 1890; Fellow and Mathematical Tutor of Magdalen College.

Howell, David Lewis; III Hist. 1887; B.A. 1887; Assistant Master, Dulwich College.

Hulse, Richard Lamplough; matriculated, 1886.

1888. **Bremridge, Richard Harding**; Demy; I Chem. 1891; I Physiol. 1893; B.Med. and M.A. 1901; Senior Science Entrance Scholarship, St. Bartholomew's Hospital, 1893; Head of Honour list in Chemistry in First B.Sc. London; Senior Demy, 1894–8; Assistant Medical Officer, Mysore Goldfields.

Fairbairn, John Shields; Demy; I Physiol. 1891; B.Med.

1895; F.R.C.S. 1900; M.R.C.P. 1901; Assistant Obstetrical Physician, St. Thomas's Hospital.

Mowbray, Archibald John Holme; Demy; II Chem. 1891.

Childs, James Francis; Demy; III Chem. 1891; settled in New Zealand, 1900.

Paget, Richard Arthur Surtees; III Chem. 1891; Barrister-at-Law, Inner Temple, 1895.

Caldwell, William Henry McKennel; B.A. 1889; Vicar of Bagshot, Surrey, 1900.

Blood, John Neptune; B.A. 1891; Barrister-at-Law, Inner Temple; B.C.L. 1898.

Long, Samuel Charles; B.A. 1891; Major, Prince Consort's Own Rifle Brigade, 1900.

1889. **Günther, Robert William Theodore**; Demy; I Morph. 1892; University Student of Biology at Naples, 1893; Lecturer in Natural Science at Magdalen College, Feb. 1894; Geographical Student, 1894; Fellow and Tutor, 1896; F.R.G.S., F.L.S.

Hichens, Peverell Smythe; I Physiol. 1892; B.Med. 1895; M.R.C.P. 1899; D.Med. 1903; Honorary Physician, Northampton General Infirmary; honourable mention for Essay for King's Sanatorium Prize Competition.

Mallam, Ernest; I Physiol. 1892; B.Med. 1895.

Stainer, Edward; Demy; II Physiol. 1892; B.Med. 1896; Physician, Skin Department, St. Thomas's Hospital, 1903.

Clouston, Joseph Storer; IV Physiol. 1892; B.A. 1892; Barrister-at-Law, Inner Temple, 1895; Writer of Novels.

Case, Thomas Bennett; I Chem. 1893; B.A. 1892; Brewer at Guinness's Brewery, Dublin.

Wright, Arthur Columbine; Demy; III Math. Mod.; I Chem. 1893; Demonstrator, Yorkshire College of Science.

Ward, Arthur; Demy; resigned 1891. Settled in British Columbia.

Chambers, Arthur John; Math. Exhibitioner; III Math. Mod.; III Math. 1888; Prelim. Chem.; matriculated, Merton; B.A. 1891; Curate of St. Mary, Worsborough, Barnsley, Yorks., 1901.

1890. **Fennell, Charles Henry**; III Physiol. 1893; D.Med. 1902; Governors' Clinical Gold Medallist, Charing Cross Hospital.

Jelly, Frank Edward; Mathematical Demy; I Math. Mod. 1889; I Math. Final 1891; III Physiol. 1893; Assistant Master, St. John's School, Leatherhead.

Sturdy, William Arthur; III Chem. 1893; B.A. 1893.

Pilcher, Alexander Munsey Warton; IV Chem. 1893; B.A. 1893.

Parker, Arthur Percy; B.A. 1889; B.Med. 1896; Assistant Surgeon, Radcliffe Infirmary; Demonstrator in Anatomy; late Surgeon, Imperial Yeomanry Hospital, Deelfontein, South Africa.

Foster, John Kenneth; M.A. 1893.

Tomlinson, Robert George; B.A. 1892.

1891. **Walker, John Allsop**; III Chem. 1894.

Hilliard, Francis Porteus Tyrrell; IV Physiol. 1894; D.Med. 1902.

Buzzard, Edward Farquhar; IV Physiol. 1894; B.Med. 1898.

Eichholz, Oreste; Demy; II Chem. 1894; B.Med. 1898; D.Med. 1903.

Gilbertson, Francis William; III Chem. 1894.

Gray, Herbert Edward; III Physiol. 1894.

1892. **Hill, Ernest George**; II Chem. 1895; Professor of Natural Science, Muir Central College, Allahabad.

Burnaby-Atkins, John; matriculated, 1892.

McDermot, Edward Terence; III Chem. 1895.

Poole, William Mansfield; III Math. Mod.; formerly Master at Merchant Taylors' School; Tutor on H.M.S. *Prince George*, Channel Squadron, 1902.

Powell, Douglas; B.A. 1896; Lieut. Royal Welsh Fusiliers, 1900; served in South African war on Staff.

Simpson, Herbert Clayton; Exhibitioner; II Chem. 1895.

Walden, Allan Frederick; Exhibitioner; I Chem. 1895; Lecturer at New College, 1898–1902.

Lindley, Lennox Hannay; M.A. and B.Med. 1898; Assistant Physician to H.I.M. the Shah of Persia.

1893. **Ashby, Harold Francis**; III Physiol. 1896.

Balfour-Browne, William Alexander Francis; II Bot. 1896.

Bayley-Worthington, Alan Brocklehurst; matriculated, 1893.

Jex-Blake, Arthur John; Demy; I Chem. 1896; II Cl. Mod. 1894; Radcliffe Travelling Fellow; B.Med. 1901.

Odling, George Smee; III Physics, 1896; assumed name of **Odling-Smee**, 1901.

Page, Alfred Finch; Demy; I Chem. 1896; formerly Master at Mill Hill School; Junior Inspector, Board of Education, 1902.

Shorter, Harry Vivian Spencer; Demy; II Chem. 1896; Assistant Master, Wheelwright Grammar School, Dewsbury.

Stancomb, William; II Chem. 1896; Brewer at Guinness's Brewery, Dublin.

Sherwood, Edward Charles; Demy; II Math. Mod. 1894; II Math. 1896; II Chem. 1897; Science Master, Westminster School, 1901; F.C.S.; Orders.

Scott, Samuel Geoffrey; III Physiol. 1897; B.Med. 1902.

Jones, George Arthur; III Physiol. 1897.

Chapman, Edward Henry, II Morph. 1897; Barrister-at-Law.

[**Mr. R. T. Günther** was appointed Lecturer in Natural Science in 1894.]

1894. **Armitage, Francis Paul**; Exhibitioner; I Chem. 1898; Assistant Master of St. Paul's School.

Hunt, Richard; matriculated, 1894.

Blaine, Gilbert; matriculated, 1893.

Ormrod, John Baxter; Demy; I.C.S. 1898; Collector and Assistant Commissioner of North-West Provinces and Oudh.

Tinne, Philip Frederic; III Physiol. 1897; M.R.C.S., L.R.C.P. 1902.

1895. **Wilson, Duncan Randolph**; Demy; I Chem. 1898; Lecturer in Chemistry, Magdalen College, 1899–1903.

Crossley, Kenneth Irwin; III Chem. 1898.

Grazebrook, George Ward William; IV Chem. 1898.

Hildesheim, Oscar; Exhibitioner; I Physiol. 1899; B.Med. 1902.

Sartoris, Arthur Hugh; matriculated, 1895.

Spilsbury, Bernard Henry; II Physiol. 1899.

1896. **Cardwell, Hugh Brodie**; matriculated, 1895.

Golla, Frederic Lucien; Demy; I Physiol. 1900.

Turnbull, Hubert Maitland; II Cl. Mod. 1896; II Physiol. 1898; B.Med. 1902; Welsh Memorial Prize, 1899.

1897. **Kaye, Henry Wynyard**; II Cl. Mod. 1896; III Physiol. 1898; B.Med. 1903.

Maclachlan, Alexander Fraser Campbell; matriculated, 1894; Lieut. King's Royal Rifles, 1901, D.S.O.

Singer, Charles Joseph; Exhibitioner; II Zool. 1899; Surgeon to Sir J. Harrington's Expedition to the Sobat River, 1903–4.

Fleischmann, Friedrich Noel Ashcroft; I Chem. 1901.

Hertz, Arthur Frederick; Demy; I Physiol. 1901; Scholar at Guy's Hospital.

Johnson, George Montague; IV Physiol. 1901.

Ryder, Charles Frederick; Demy; II Zool. 1901.

Strutt, George Aston; matriculated, 1897.

Vickers, Vincent Cartwright; matriculated, 1897.

Whitnall, Samuel Ernest; III Zool. 1901; Welsh Memorial Prize, 1903.

1898. **Curling, Bryan James**; Lieut. King's Royal Rifles, 1901.

Medlicott, Walter Sandfield; matriculated, 1898.

Neave, Sheffield Airey; III Zool. 1902; Naturalist on Geodetic Survey of Rhodesia, 1903.

Spencer, William Kingdon; Demy; I Zool. 1902; Burdett-Coutts Scholar, 1902; Demonstrator to the Professor of Geology, 1903; F.G.S.; Junior Inspector of Schools, 1903.

Webb, Arthur James; Exhibitioner; II Chem. 1901.

Dutton, Henry Hampden; III Geol. 1902.

Hilton, Harold; Exhibitioner of Hertford; Fellow of Magdalen, 1898; I Math. Mod. 1896; I Math. 1898; Senior Mathematical Scholar, 1899; Lecturer at Bangor.

1899. **de la Rue, Ivor Andros**; III Chem. 1902.

Galloway, John; III Physiol. 1903; of the Inner Temple, 1903.

Girdlestone, Morrell Andrew; Lieut. Royal Garrison Artillery, 1902; Native Artillery, India, 1903.

Monck, George Stanley Stevens; matriculated, 1899.

Riley, Percy Herbert; IV Chem. 1903.

Semon, Henry Charles Gustav; II Physiol. 1903; Entrance Scholarship, University College Hospital, London.

Simonds, John Hayes; Lieut. Royal Berkshire Regiment, 1902.

Stewart, David Macfarlane; Demy, 1897–1901; I Math. Mod. 1898; II Cl. Mod. 1899; I Physics, 1900; II Lit. Hum. 1901; I Math., II Law, 1902; I.C.S. 1902, Bengal.

Sturrock, William Duncan; Exhibitioner, 1899; I Physiol. 1903; Entrance Scholarship, King's College Hospital.

Walker, Bertram James; matriculated, 1899; 2nd Lieut. Northamptonshire Imperial Yeomanry, South Africa.

1900. **Clowes, George Charles Knight**; matriculated, 1900.

Knight, John Guy Douglas; matriculated, 1900; South Africa.

Wallin, Charles Ethelbert; Exhibitioner; II Chem. 1903.

1901. **Douglas, Claude Gordon**; Demy; matriculated at New College, 1900.

Everitt, Charles; Demy; I Math. Mod.; I Chem. 1902; IV Geol. 1903.

Martin, Charles Herbert George; matriculated, 1900.

Daniel, William Rothwell; Demy; II Math. Mod.; I Chem. 1903; in South Africa, 1903.

de la Rue, Stuart Andros; matriculated, 1901; until 1903.

Fisher, Kenneth; Demy, 1901.

Potter, Ley Francis; Demy, 1901.

Flower, Conrad Herbert; matriculated, 1902.

1902. **Stewart, Robert Henry Rynn**; matriculated, 1901.

Ackers, Charles Penrhyn; matriculated, 1901.

Aldridge, Frederick James; matriculated, 1902.

Bethell, Hon. Richard; matriculated, 1902.

Carlisle, Kenneth Methven; matriculated, 1901.

Gardner, Thomas Edward; Demy, 1902.

Osborne, Charles Glidden; matriculated, 1902; of Harvard, U.S.A., 1903.

Stancomb, John; matriculated, 1902.

1903. **Morrell, James Herbert**; matriculated, 1901; II Math. Mod. 1903.

Stobart, James Douglas; matriculated, 1902.

Fry, Herbert John Burgess; Exhibitioner, 1903.

Nalder, Howard Gilbert; matriculated, 1903.

Beevor, Charles Ferrier; matriculated, 1903.

Birchall, Edward Vivian Dearman; matriculated, 1903.

Dutton, Francis Bridger; matriculated, 1903.

Hubbard, Hon. Raymond Egerton; matriculated, 1903.

Willett, Herbert William Mills; matriculated, 1903.

Register of Persons, not being Members of Magdalen College, who have worked with Mr. J. J. Manley [1] in the Daubeny Laboratory since 1893.

A large proportion of those whose names occur in this list have attended the evening courses of practical instruction. Ever since the commencement of these courses under Mr. Manley's superintendence they have become increasingly popular, and a very valuable adjunct to the ordinary classes. So much so, that but for this opportunity many men, some of whom have been Elementary Schoolmasters, would not have been able to read for the Honour Chemistry School.

It is to be hoped that, for the benefit of this class of student, and also in the interests of others, the University will find means to open laboratories to those who wish to devote the evenings to practical work.

1893. Liddell, Henry Andrew; Non-Collegiate; B.A. 1896; Head Master of Wesleyan School, Oxford.

Judge, Thomas; St. John's, I Chem. 1896; Professor of Chemistry at Bangkok.

Phillips, Harry Edward William; Non-Collegiate, II Chem. 1895; Science Master of Boys' High School, Oxford, and Training College for Girls, Banbury Road, Oxford.

[1] Mr. Manley received the degree of Honorary M.A. on December 8, 1903, and the Public Orator, on presenting him to the Vice-Chancellor, made the following speech:

Insignissime Vice-Cancellarie, vosque egregii procuratores:

Praesento vobis spectatum et bene instructum virum, Joannem Job Manley, per annos XVI. officinae Daubeniensis apud Collegium S.M. Magdalenae curatorem: qui singulari habilitate praeditus et scientiae physicae rudimentis imbutus mox tirocinium posuit et ad investigationes altiores suopte se ingenio contulit et scriptis exposuit. Quorum quidem scriptorum neque titulos neque argumentum facile est coram vobis effingere: sunt enim istae res non modo non versu sed ne pedestri quidem oratione dicendae: quippe propter Latini sermonis egestatem neque acidi nitrici vim et naturam et densitatem, neque exquisitas metiendi rationes verbis possim exprimere. Constat autem has auctoris gravissimi lucubrationes doctis Societatibus cum nostratium tum externarum gentium adeo se commendavisse ut in linguam Teutonicam conversae multum habeant ponderis et momenti.

Duco ad vos eruditum et expertum virum, discipulis pariter et collegis acceptum, de scientia chemica optime meritum, ut admittatur ad gradum Magistri in facultate Artium, honoris causa.

1894. [1] **Simpson, Herbert Clayton**; Exhibitioner of Magdalen, II Chem. 1895; Professor at Toronto, 1903.

Lysons, Nigel Lucius Samuel; Captain, the King's Own (Royal Lancaster Regiment); Adjutant, 1902.

Fisher, Harold Pearson; son of W. W. Fisher (p. 112).

1895. **Hartland, Brantford**; St. John's.

Hughes-Games, Harold James Wynn; Worcester, B.A. 1895.

Walter, Ralph; New College, III Chem. 1896.

Young, John William Alexander; New College, II Chem. 1896.

Bevers, Edmund Cecil; St. John's, II Physiol. 1897.

Elford, Stanley; St. John's, III Chem. 1898.

Pinching, Charles James; St. John's, III Physiol. 1898.

Hastings-Wilson, David Herbert; St. John's, M.A. 1899.

Hoare, Charles Hervey; New College, Aegrot. Chem. 1898.

Tyser, Lionel Robert; New College.

Farncombe, Edgar Leonard; St. John's, III Physiol. 1898.

1896. **Carpenter, Henry Cort Harold**; Postmaster of Merton, I Chem. 1896.

Chaundy, J. H.

[1] **Knollys, Reginald William**; Magdalen.

Johnson, Bertie Cecil; St. John's, III Chem. 1898.

Crum, Walter Erskine; New College, II Chem. 1897.

Bennett, George Lowe; Casberd Exhibitioner of St. John's; M.A. 1901; F.C.S.; Curate of St. Saviour, Everton, 1899.

Ryman-Hall, Bertie Ryman; St. John's, B.A. 1896.

Richards, Owen William; Fellow of New College; I Cl. Mod. 1894; II Physiol. 1896.

Richardson, George Beigh; Worcester, B.A. 1896.

Blakelock, Lawrence Neville Salts; Queen's, IV Chem. 1899; Curate of Odd-Rode, Cheshire, 1900.

Billinghurst, Walter Binsmead; Scholar of St. John's, II Chem. 1898.

Sparrow, Robert Burslem; Lincoln.

Spicer, Edward Clarke; New College, I Geol. 1899; Late Scholar of Trinity College, Melbourne, M.A. 1879; Queensland Mission, 1884–5; Java, 1885–6; Burdett-

[1] These two entries should have appeared in this form in the lists on pp. 126 and 127.

Coutts Scholar, 1899; Rector of Throwleigh, Devon, 1889–95.

Scrivenor, John Brooke; Hertford, I Geol. 1899; Burdett-Coutts Scholar, 1899.

Smith, George Frederick Darwall; New College, II Cl. Mod. 1894; I Physiol. 1896.

1897. **Gorst, Henry Sidney**; St. John's, I Chem. 1898.

M'Lachlan, John; M.D. Edin.; Queen's, II Chem. 1900.

Elliott, Arthur Abercrombie; B.A. 1897.

Frewin, James Gilbert; Non-Collegiate, I Chem. 1899.

Purnell, George Sykes; Non-Collegiate, IV Chem. 1900.

Freeman, Willie Ludford; St. Edmund Hall, III. Chem. 1900; F.C.S.

Taylor, Arthur Henry; St. John's, IV Physiol. 1896.

Barber, Charles Harrison; Non-Collegiate, I Physiol. 1900; Shute Scholar, 1897.

Smith, Eric McLeod; Queen's, III Physiol. 1900.

1898. **Eling, Thomas Henry James**; Non-Collegiate, III Chem. 1899.

Rowlands, David Ellis; Jesus, IV Phys. 1899.

Williams, Jeremiah; Jesus, III Chem. 1900.

Soddy, Frederick; Postmaster of Merton, I Chem. 1899.

McMullen, Alexander Percy; Postmaster of Merton, I Chem. 1898.

Inman, Harold Mundee; St. John's, IV Physiol. 1901.

Day, William Leigh Maule; Exeter, B.A. 1899.

Crosfield, George Henry; University, III Physiol. 1901.

Young, Harold Spencer; Balliol, matriculated, 1901.

Grosvenor, Norman Edward; Brasenose, IV Physiol. 1899.

Baker, Henry Hugh; University, III Physiol. 1900.

Mullins, Arthur Francis; Keble.

Tordoff, Bertram; Casberd Scholar of St. John's, I Physiol. 1902.

Hubble, Harry Oswald; St. Edmund Hall.

Roberts, Jonathan Hugh; Jesus, II Chem. 1901.

Elford, Bertram; St. John's, Aegrotat. Chem. 1902.

Elford, Archibald Sefton; St. John's, III Chem. 1902.

Henderson, Turner; University, B.A. 1901.

1899. **Allen, Francis Wellwood**; Jesus, IV Chem. 1902.

Spear, Robert Heron; Jesus, II Chem. 1899.
Tidy, Henry Letheby; New College, II Chem. 1900.
Lee, Edward Cornwall; University.
Shelley, Arnold; Keble, B.A. 1899.
White, Thomas Richard; Non-Collegiate, IV Chem. 1901.
White, Robert Murray; Non-Collegiate, matriculated, 1897.
Bibby, Robert Gordon; New College, matriculated, 1899.
Murray, Ælfric Charles Ruthven; Wadham, IV Chem. 1902.
Ping, Lawrence Spencer; Non-Collegiate, II Chem. 1901.
Billings, George Michael; Jesus, matriculated, 1896.
Griffith, William Edward; Non-Collegiate, B.A. 1902.
Pridham, Charles Albert; St. John's, III Chem. 1902.
Davis, John Sidney; Non-Collegiate, III Physics, 1902.

1900. **Cooper, Jabez Horace**; Scholar of Jesus, I Chem. 1903.
Baker, Sydney Harold; Scholar of Jesus, II Chem. 1903.
Naab, Frederick; Non-Collegiate, B.A. 1901.
Collins, Charles Edwin; Lincoln.
Bott, Arthur Everard Hulton; Jesus, II Chem. 1903.
Buck, Henry Charles; Non-Collegiate, III Chem. 1903.
Moore, Claude; St. Mary Hall, B.A.; Head Master of the Boys' Central School, Oxford.
Seys, Roger C.
Seys, G. William } not members of the University.
Mockridge, Albert James; Head Master of School for Pupil Teachers, Oxford.
Loxley, Frederick Lionel Keith, of Oxford.
Monier-Williams, Gordon Wickham; University, I Chem. 1903.
Marshall, Reginald Philip; Keble, III Chem. 1901.
Scott, John Irwin; Exhibitioner of Merton, I Chem. 1901.
Cooke, Henry Harwood; New College, II Chem. 1901.
Mortimer, Alfred; Exhibitioner of Exeter.

1901. **Thomas, William Jones**; Jesus, matriculated, 1900.
John, William Alfred; Scholar of Jesus, matriculated, 1901.
Cocks, Reginald Henry; Lincoln, II Chem. 1903.
Graham, Richard Percival Devereux; Non-Collegiate, matriculated, 1900.
Beards, Clifford; Scholar of Jesus, matriculated, 1901.
Morris, Joseph; Non-Collegiate, II Chem. 1903.

Coles, Alfred Bertram; Non-Collegiate, matriculated, 1901.
James, Garnet Williams; Jesus, matriculated, 1901.
Taylor, Reginald Lionel; Hertford, matriculated, 1900.
Lambourne, Christopher; Non-Collegiate, matriculated, 1900.

1902. **Bentley, Walter Henry**; Exhibitioner of Merton, matriculated, 1899.
Sadler, Ralph Trego; Non-Collegiate, Shute Scholar, 1901.
Starley, Bertram Allan; Wadham, matriculated, 1899.
Stote-Fox, Robert; Hertford, IV Chem. 1903.
Adlam, George Henry Joseph; Wadham, matriculated, 1901.
Scott, Robert Watson; Non-Collegiate, Leathersellers' Exhibitioner, 1902.
Farrands, Harry; Non-Collegiate, matriculated, 1901.
Wright, Thomas Josiah; Non-Collegiate, matriculated, 1900.

1903. **Evans, Charles Irwin**; St. John's, III Chem. 1903.
Scothern, Albert Edward; Non-Collegiate, matriculated, 1902.
Swallow, Luther James; Exhibitioner of Lincoln.
Japp, Darsie Napier; St. John's, matriculated, 1901.
Benson-Baker, William Henry; University.
Moss, Albert Henry; Non-Collegiate, matriculated, 1902.
Ford, Leonard Talman; Postmaster of Merton, I Chem. 1903.
Micklewright, Harry George Fletcher; Postmaster of Merton, I Chem. 1903.
Lambert, Bertram; Exhibitioner of Merton, I Chem. 1903.
Simpson, James Charles; Non-Collegiate, matriculated, 1902.
Thomas, Robert Edward; Non-Collegiate, matriculated, 1900.
Hawtin, Herbert Edwin; Non-Collegiate, matriculated, 1900.
Wheatley, William; Non-Collegiate, matriculated, 1903.
Trump, Richard John; Jesus, matriculated, 1902.
Kenrick, Kenrick Lloyd; Scholar of Jesus, 1902.
Pinnock, Henry Tremayne; Exeter, matriculated, 1901.
Myles, Charles Derwentwater; Exeter, matriculated, 1901.
Bond, William Frederick; Exeter, matriculated, 1901.

Batchelor, Tremlett Brewer; University, matriculated, 1903.

Pearson, Wilfrid John; University, matriculated, 1903.

Zacharias, George Jessel; Scholar of University, 1902.

*** *The original MS. Registers consist for the most part of columns of signatures and lists of names, often without initials, and sometimes hardly to be deciphered. In printing them in the form of Appendix E, we have added certain biographical information with the intention of facilitating the identification of the names, but without any pretence to completeness or to uniformity of treatment. While selecting such material as was most readily accessible to us, we have endeavoured to indicate by date of matriculation or of degree the academical status of each person at the time he attended the lectures. If no name of a College be stated after a person's name, he may be presumed not to have been a member of the University. The initials (D.N.B.) show that some account of the individual is to be found in the* Dictionary of National Biography. *It must also be stated that in cases where the same name appears at intervals for a number of years, we have only recorded the first entry, so that no attempt has been made to distinguish between persons who worked in the Laboratory for a prolonged period and those who only attended for a single term.*

The errors in the lists, both of omission and of commission, would have been much more numerous if we had not enjoyed the help of many of our colleagues, and especially of Messrs. Chapman, Turner, Webb, and Wilson.

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A DOCTOR OF MEDICINE

MAGDALEN COLLEGE, 1508

The Daubeny Laboratory Register

1904—1915

With notes on the teaching of Natural Philosophy and with lists of Scientific Researches carried out by Members of Magdalen College, Oxford

By R. T. Günther, M.A., F.L.S.

Fellow and Tutor of Magdalen College

Me thinketh it acordant to resoun,
To telle yow alle the condicioun
Of eche of hem, so as it semed me,
And which they weren, and of what degre;
And eek in what array that they were inne.

CHAUCER.

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PREFACE

THESE lists and bibliographies of Members of Magdalen College who have contributed to the advancement of some branch of Natural Science or who have attended courses of instruction in the College laboratory, were compiled before the outbreak of war as a supplement to the Register, printed in 1904 as Appendix E to the *History of the Daubeny Laboratory*. They are a record of ten years of quiet achievement by those who have been trained in the Science Schools of Oxford.

Some historical and biographical notes on those who are no longer with us, but to whom much of the success of the laboratory has been due, had also been prepared, but with other historical matter are now omitted. The chapters may therefore appear somewhat disconnected. We hope yet, after the war, to pay this tribute to the memory of our friend and predecessor Edward Chapman, and to that of Yule, Payne, Hopkins, Burdon-Sanderson, and others.

In the earlier part of the Register of Members of the University who have worked in the Daubeny Laboratory, places in the class-lists of the Honour School of Natural Science, and professional appointments were quoted as indications of relative success. There is, however, a tendency in academic circles to overrate the value of such data, and a wider knowledge of the world shows us that the ultimate success of students is not to be estimated by the awards of examiners. Published works afford a surer measure of a man's capacity to contribute to the advancement of knowledge, but we are aware that even this criterion may fail: Dr. Edmund Cartwright, the greatest inventive genius connected with Magdalen, wrote little, and his writings were trivial when compared with his contrivances.

To make our record therefore more complete than was the earlier one, we have appended bibliographies to the names in

the Register; and to compare the achievements in Natural Science of the earlier members of the College with those of the post-Daubenian period, we have added a list of their scientific writings. This, though doubtless not complete, shows how recently it is that Magdalen men have turned their attention to the Philosophy of Nature. We see that only sixteen scientific treatises appeared before the nineteenth century. Wotton, 1552, the first on the list, was evidently one of the last of the great Schoolmen. Gowin Knight and Cartwright were the only two authors who became Fellows of the Royal Society before Daubeny; whereas many of Daubeny's pupils received this honour.

But it is only since Demyships and Exhibitions have been awarded for Natural Science (less than fifty years ago), and after Edward Chapman had been appointed lecturer, that the success of Magdalen as a science College may be said to have begun.

The classes in the Schools obtained by Demies, Exhibitioners, and Commoners admit of being tabulated, and thus of being compared with results in other Colleges.

The following conditions have been found to make for the success of a science school.

1. Scholarships. If awards be made after examination, the best results are obtained by holding the examination at a season when the best candidates are likely to enter, and before they have made arrangements to go elsewhere.

2. The College tutorial system has been most successful in colleges in which tutors in Natural Science have the advantage of a college laboratory. Apparatus and collections are as essential to tuition in science as books in classics, or as sand, blackboard, or paper for tuition in mathematics.

3. Personal intercourse with the professors. Frequent visits by the professor have a stimulating influence on the students in his laboratory. Prof. J. J. Thomson's success has been largely due to this, and to 'Laboratory Teas', at which students discuss their problems *sine ulla solennitate*. As a student I derived much benefit from Seminars.

4. Possibility of residing near their Colleges for science

tutors who believe that the efficiency of their work is impaired if they live at a distance.

If a proposal were made to tutors resident in College that they should take their pupils in a room a mile away from their own studies, they would answer that for efficient teaching they must be surrounded by their books; that these cannot be in two places at once; that a room only used for seeing men is apt to become a mere office; that the touch between tutor and pupil that contributes to make a valuable and distinctive feature of Oxford life would be lost, as well might they be at one of the new universities.

For original workers, residence at a distance means that in ninety-nine cases out of a 100, researches requiring continuous attention are simply not undertaken.[1]

5. Facilities for travel and for work at other centres. More frequent intercourse between Oxford, Cambridge, and London would be advantageous. There are many subjects that cannot be studied at all except during certain seasons: it is undesirable that the necessity of keeping Terms during the whole of his young working life should debar an investigator from ever once gaining first-hand information on such subjects.

6. Research in actual progress in a laboratory has a most stimulating influence on other workers, even though they be only reading for examinations.

7. A fund for the encouragement of useful and successful research from which a proportion of the incidental expenses for materials may be defrayed.

[1] Some of the advantages of near residence were outlined by * * in the *Oxford Magazine* for March 6, 1901. Dr. Daubeny built a house at his own expense that he might live next his laboratory, and Edward Chapman, feeling the disadvantage of living at the other end of the town left Frewen Hall and rented Magdalen Gate House, to the great benefit of both senior and junior members of his College. Magdalen will not easily find a successor able and willing, for an ideal in efficiency, to make a monetary sacrifice equivalent to the value of his Fellowship. No one is more fully conscious than the present Science tutor of the daily waste of time, of energy and efficiency incurred in living at a distance; and in his own particular case it has involved the practical scrapping of a unique educational plant. Few scientific teachers have been more successful than Dr. Buckland: he was inseparable from his specimens.

The administration of such funds would need the strictest supervision. It has happened only too often that those who clamour the loudest (or the most diplomatically) have received the lion's share. And we well know that without due control

> Science's ravenous maw (like an ogress's)
> Takes what we give her and clamours for more.

Waste is not unknown in hospital or in laboratory administration.

8. Adequate stipends for Science Tutors (and Science Masters in Schools). Expense in literary work begins and ends with the acquisition of books, and research consists in reading them. Classical authors and philosophical books are for the most part cheap. The Science man has greater expenses at every stage of his career. Training, books, instruments, materials are a perennial charge, and 'economy' in them too often means failure to keep abreast of scientific progress. Towards the end of his life Daubeny estimated the value of his plant for teaching and research at £3,000: my own is insured at half that amount. In some professions interest is expected upon capital outlay. More equitable treatment would undoubtedly result in an increase in the number of men who are able to take up scientific work, to the benefit of the country.

9. Emancipation of scientific affairs from the control of the classical element in the Colleges.[1] On at least one governing body in Oxford the classical majority has a predominant voting power of eight to one on matters essentially affecting the welfare of Natural Science. Voting by faculties would be more fair.

10. Recognition of the value of the study of the History of Science, and the appointment of special Curators for the Science collections. In several branches of Science the historical aspect is almost entirely ignored, Medicine being a notable exception. Such historical study would be greatly aided by the formation of suitable collections.

[1] Every commander of an Army Corps must have authority over all its business 'without War Office interference in details'. (Prof. Spenser Wilkinson's *Way to Victory*. 26 Feb., 1916.)

The aims of Museums and Laboratories differ widely. Laboratories should always be abreast of the times. A Museum represents the past, its *locus standi* is to deal with what is out-of-date. It has many functions, a minor one being to record the history of research in laboratories, and it should not be continually refashioning itself to take their place.

The older scientific members of the College may feel a collective pride and an incentive in the fact that in the short space of the last ten years more contributions to true scientific learning have been made by them than by all their predecessors since the foundation of the College. Many of our graduates are now doing expert work in connexion with munitions of war. The practical study of Physical Chemistry, introduced into Oxford in the Daubeny Laboratory, has become an increasingly important branch of study and is now to have a special professorship. Research, on which we have so long insisted, is at last to be made an integral part of the Chemical School. There are many branches of science in which pioneer work may yet be done in college laboratories. That is their justification. Experience shows that work done in private laboratories to-day will be done in those of the University to-morrow.

One other matter should be mentioned. The practice of the present science tutor at Magdalen has differed from that of his contemporaries at other Colleges in that he has endeavoured to give instruction in the elements of all the sciences recognized by the Natural Science Board, viz. Physics, Chemistry, Zoology, Physiology, Botany, Geology. The days have long gone past when any one person could undertake the whole instruction for the Honours School in even one of these subjects; for this recourse must always be had to specialist-tutors. But there are very great advantages in a science tutor of a relatively small number of men (never exceeding one-seventh of the undergraduates in residence in his College) becoming personally acquainted with the work of all his men while they are still reading for their preliminary examinations. Though this diffusing of work has hindered concentration on

special research, economically it has resulted in a considerable saving of fees either to the Tuition Fund or to the pupils. Naturally a Chemistry tutor with many pupils could not have done it; it was only possible for a biological tutor with but few pupils reading for his special school.

This has been the policy at Magdalen for two generations of tutors. There have been failures as well as successes: the results are now open to criticism.

I feel sure that all the Scientific Members of the College will join me in expressing warm thanks to the special tutors who have superintended their work for the Final Honour Schools. We must specially mention Drs. Watts, Vernon, Church, Messrs. Wilson, Sidgwick, and Moore, and the present Daubeny Curator, Mr. J. J. Manley, whose teaching, patience, and wonderful manipulative skill are gratefully remembered by many generations of science men.

The President of Magdalen, though first and foremost a lover of Poetry and the Classics, has always been ready to encourage the scientific element in the College.

Also my classical colleagues on the Tutorial Board must be thanked for their kind consideration of the claims of Natural Science: had they been able to go a step further and give active support to oft-repeated proposals concerning science scholarship examinations the College would now have bettered its present record of usefulness in war-service. It is a matter for regret that while Magdalen has done so much to encourage the study of Natural Science, a majority of the classical vote in the University, on the pretext of trying an experiment in education, should in 1900 have sapped our supply of science students. Swayed by an agitation engineered at Schoolmasters' conferences, the classical majority assented to an alteration in the date of examination for science scholarships, of which the ultimate result has been that Cambridge already in a strong position for the selection of Scholars has been given an overwhelming advantage. In short, Natural Science in Oxford was made a pawn in the game and was sacrificed to the supposed interests of classics. Magdalen in the interests of Oxford should have stood out against the innovation; classical studies

in the University are said not to have benefited by it; that science has lost is incontrovertible, for the effect has been to reduce the number of the best type of scholars reading Natural Science.

Taking two periods of twelve years before and after 1900, in the medical school, the men reading for honours in Physiology in Magdalen were:

	Before 1900	After 1900
Demies and exhibitioners	8	2
Commoners	18	5

In Zoology three demies have been elected before, only one after 1900.

In Chemistry the falling off in numbers is less marked, but the quality of the work of candidates sent up by the schools for scholarships has often been so poor that Colleges have been unable to elect, and from this the candidates' parents might reasonably infer that the energy expended at the schoolmasters' conferences would be more profitably employed in brushing up the teaching at the schools.

It is not only from the narrow standpoint of University politics that we are deploring the close-time agreement: more, alas, is involved. The shortage of science candidates in the last twelve years is telling on us now, an early death has bereft us lately of some of our best scientific workers, the war is robbing us of many more; the country now needs all the scientific assistance it can obtain, and Oxford has insufficient reserves for making these losses good.

But for the outbreak of war the publication of this report would have taken place in 1915. An indefinite postponement seemed at first the only course to pursue: on second thoughts however, the necessity for inventories setting out the intellectual assets of the nation seemed to make the preparation of such lists a national duty, and we have proceeded.

The flower of our manhood and youth have been allowed hitherto to form a rampart for slackers and shirkers. The suddenness of the emergency gave our lawyer-politicians the semblance of an excuse for a want of prevision that is now

costing the country the best of one generation: with lists such as this to hand, they would have less excuse for heedless procedure. If as a result a few of the burdens of war are adjusted with an intelligent appreciation as to the parts that men of conspicuous ability and special training are best fitted to perform, the work of compilation will be amply repaid.

R. T. GÜNTHER.

March 1916.

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The pagination of this volume continues that of the History, *to facilitate the construction of a combined index to both parts of the Register.*

CORRIGENDA TO THE *HISTORY OF THE DAUBENY LABORATORY*

p. 3 lines 5 and 24 for 1622 read 1621

p. 5 line 1 for *Sibthorp* read *Sibthorp's successor, Williams*

„ 23 for *death of Dr. Daubeny* read *resignation of Prof. Lawson in 1882*

p. 62 line 29 for *Industry* read *Husbandry*

Old events have modern meanings; only that survives
Of past history which finds kindred in all hearts and lives.
LOWELL.

THE LABORATORY BUILDINGS

A FEW alterations have been made in the Laboratory Buildings since the printing of our Report in 1904.

Externally, the quotation

SINE EXPERIENTIA
NIHIL SUFFICIENTER
SCIRI POTEST

taken from the works of our first Oxford Chemist, Roger Bacon, was chosen as an appropriate ornament for a tablet over the new entrance to the Daubeny Laboratory. We believe this tablet, setting forth the principle that distinguishes true Science from false, to be the first memorial erected in Oxford in honour of the great master. To give it the character of Bacon's own time, the lettering was copied from a mural inscription which was chiselled by his young contemporary, Giotto: thus we doubly recall that early renaissance which, gleaming with so much splendour in Italy both in art and learning, kindled the fire of Bacon's genius, so that for a time our Northern University shone forth with its light. We say for a time, because an all-despotic Church soon set limits to the advancement of learning. By a Papal rescript the members of a University were to 'be content with the landmarks of science already fixed by their fathers'. Woe to him who ventured further!

Some of the rooms have also been rearranged. The increase of motor-bus, motor-lorry, and other heavy traffic over the uneven surface of a road not originally made for such locomotives, rendered the top-floor rooms unsuitable for weighing and for other delicate operations. The balances of precision and sensitive galvanometers, rendered useless on account of the vibration of the upper floor, have now been moved into the 'research laboratory' on the ground floor, and parts of the

Collections have taken their place in the old Elementary Physics room. The original Photographic room has been made over to the Curator for special work, and the workshop has been moved to the east end of the building.

The amenities of the Laboratory were very seriously impaired by the addition of a new wing to the University Botanical Laboratory in 1911. The only two detached rooms in the Daubeny Laboratory having a sunny aspect (for all the others face north) were Dr. Daubeny's study, for many years the private room of the tutor in Natural Science, and a still more pleasant room above it: these were spoiled by the erection, in close proximity to their windows, of the closets and sanitary apparatus of the new Botanical Building. A needlessly high parapet not only increased the cost and badly proportioned elevation of the latter building, but by obstructing the ancient lights of the Daubeny Laboratory has greatly depreciated its value to the College. The alterations to the Botanical lecture-room, moreover, produced a settlement and cracks in the south wall of the Daubeny Laboratory.

The heating apparatus, on a patent high-pressure system with small-bore pipes and no radiators, has not been found a success. Parts of the building get over-heated, while some of the rooms are uninhabitable in cold weather. This causes great loss of time.

The arrangement of the draught-cupboard in the splay of a window facing south has been found to work most satisfactorily, for when the sun shines into it, it is self-ventilating. The advantage of good illumination is so obvious, that the arrangement has been imitated in the new University Chemical Laboratory, now in process of construction.

The electric light and power circuits were put in anew in 1909–10, and have proved adequate.

In addition to more domestic uses, the Lecture Room has been in frequent demand for the mathematical lectures of Prof. Elliott and Mr. Pedder, for Mr. Duthie's lectures on Indian Botany, and for Mr. Moore's on Electrochemistry, including courses on the Electrochemistry of Solutions and on Electromotive force (delivered four times); on Homo-

geneous equilibrium (delivered thrice) and on the application of Physical methods to Chemical problems. Mr. Manley's courses of instruction in Physics for boys from Magdalen College School have been continued, and have also been attended by a class of Belgian boys who are in Oxford in charge of Monsieur Locus.

The Waynflete Praelectors of Natural Philosophy

The first attempts we made to compare the work of Dr. Daubeny with that of his predecessors at Magdalen, were frustrated by the absence of any lists of the Waynflete Praelectors; and when with some trouble we had compiled one, necessarily imperfect, from a chronological list of the members of the College compiled by Dr. Bloxam, we found that we had conjured up a world long-forgotten, in which a state of things persisted that had come down from antiquity, and like a shadow from the Dark Ages fell across the bright path of early Victorian progress.

Dr. Daubeny was the last of a long line of Waynflete Praelectors of Natural Philosophy on the old foundation of the College. To him is due the honour of having introduced the study of Natural Science into Magdalen; but we had no conception how great the achievement really was, till we began to study the sterile methods of his predecessors.

To the President and 13 senior Fellows was confided the responsibility of selecting the Praelectors of Natural Philosophy. Their nominees were doubtless admirably qualified as *praelectors*, but the electors were certainly unfortunate in their choice of Natural Philosophers. Not once in a space of four centuries, did they even by accident, light on talent for the original investigation of phenomena upon which Natural Philosophy is based. Literary qualifications seem to have been their standard for the office: indeed the very tenure of a Praelectorship seems to have restrained any endeavour to contribute to the advancement of natural learning, even when the candidates at the time of their appointment were men of promise, as 'Pioneers' in the New Atlantis.

The principal aim of the better lecturers appears to have been to perfect their pupils in the art of dialectic fencing, of quitting them-

selves 'sharplie and soundlie' in their public disputations. During the latter two centuries, singularly few of their pupils were admitted to the Royal Society, or achieved any other scientific distinction. Various reasons for the failure of the Praelectors may be alleged: the income may have been insufficient to attract the best men; they had not the advantage of a College observatory, or laboratory for demonstrations; but we believe the chief reasons to have been that the Founder's statutes permitted the praelectors to lecture on moral instead of on natural philosophy, and that the 'Natural Philosophy' courses were for the greater part of the time confined to readings in Aristotle. In the philosophical studies at Oxford Aristotle thus endowed, held undisputed sway. Right up to the threshold of the 19th century, at the ceremony for taking the degree of B.A., the student when formally asked the heads of the predicables is said to have formally replied, 'Aristoteles pro me respondebit'[1]. And so ingrained was the doctrine of blind acceptance, that it was not infrequent for 'the tutors in their lectures upon many points of philosophy to tell their pupils that in the schools they must hold such a side of the argument; but that the other side is demonstrably the right side'[2]. . . Signs of progress were apparent, for in 1726, 'Locke, Clarke, and Sir Isaac Newton begin to find countenance . . . and Aristotle seems to totter on his antient throne'. But for long the Magdalen Praelectors continued his trusty retainers.

As Fowler has pointed out, in the case of Corpus Christi College, the College system was an excellent system of instruction and discipline for converting 'a body of raw youths, gathered probably to a large extent from the College estates, into studious and accomplished ecclesiastics': but this training does not make men of science.

We feel confident that it was no part of the Founder's scheme to restrict the benefits of his Foundation to students of theology or to parish priests. He desired that his Philosophers should be religious, and that his clergy should be acquainted with Natural Philosophy. Magdalen has sent thousands of ministers into the country during those four centuries: we cannot think of one who produced any good work as the result of his teaching in Natural Philosophy, or who used his opportunities as, for example, Gilbert White did his. Edmund Cartwright, among the Fellows, was in one sense an exception, but he had received his early training at University College, and though not strictly a man of science, was imbued with the right spirit. His

[1] *Oxf. Undergraduate's Journal*, 1867, p. 166.
[2] Amherst, *Terrae-filius*, No. xxi, 1721.

magnificent work for the improvement of agriculture and of weaving gives him high rank among the inventors belonging to the period of great industrial revolutions.

According to the scheme of William of Waynflete, our Founder, during a certain portion of the year, Lectures were to be read by the Bachelors in the Faculty of Arts, thrice a week, "when lawful impediment there is none, in the Nave of the Chapel, or elsewhere . . . on some useful or first-rate subject, to wit, Algebra ; or on the Treatise concerning the Sphere, or regarding the Motion of the Planets." A Person absent without reasonable cause was punished by the subtraction of his Commons to an extent proportionate to his absences.

Moreover, as our Founder "with the greatest and most glowing desire of heart" coveted "the diligent, profound and assiduous instruction, not only of the Scholars and Fellows of [Magdalen] College but also of all and singular other Students, especially those who devote themselves to the Faculties of Philosophy, and Sacred Theology in the University of Oxford", he enacted, ordained, and willed,[1] "that for all future times there be in our College aforesaid, three Lectures, fully endowed with the graces for lecturing, Morals and Sciences." Two, Masters of Arts, were "openly and publicly to lecture in Philosophy to all and singular the Scholars, well as of our College, as others also, Seculars and Regulars, who from any quarter flock to the said College, and who are desirous of hearing the said Lectures; and they are to demand nothing from their hearers; and this in such manner that one of the said Masters of Arts do lecture on Natural Philosophy, beginning about six o'clock in the morning on all working days in full Term, from the Feast of St. Dionysius to the Feast of St. Peter, called Ad Vincula."

The Waynflete Lecturer in Natural Philosophy was to have lawful and free power to lecture in Moral Philosophy, and over and above his ordinary emoluments, was to receive £6 13*s.* 4*d.* for his labours.

It was also enacted that if Readers of greater attainments, aptitude, and excellence for the purpose of giving lectures on Natural Philosophy, should be found in the University of Oxford without the College, than those within the College, and the number of the Fellows and Scholars of our College be complete, then the said more accomplished Lecturers should be taken for the purpose of the said Lectures at the aforesaid salary. Such Lecturers 'being strangers to our

[1] *Statutes of Magdalen College*, Ward's Translation.

College, may, if they will, of whatever country or (diocese?) they are, be substituted in the next vacant places of any Fellows or Scholars withdrawing or deceasing.' Provision was also made for the payment of salary to the Waynflete Lecturer if 'any great or grievous Plague' should cause him to remove, and to continue to instruct his pupils, beyond the walls of the University.

We do not know who first undertook the duties of Waynflete Reader in Natural Philosophy, but we should like to think that it was John Perch, the first Bachelor of Physick on the roll of Fellows of the College, whose memorial brasses have been once more pieced together and restored to the College Chapel in our own time.

The appearance of a fifteenth-century Doctor of Medicine is well represented by the statue in the Cloisters of Magdalen College. (*See* the frontispiece.) He is represented in his gown, with his hood thrown across his shoulders, in the act of examining some liquid in a urine-glass, probably with the intention of thus diagnosing a malady, and perhaps of thus earning a fee to put into the somewhat empty purse which he carries in his left hand.[1]

The equipment for teaching probably consisted of a few books, and possibly of a simple armillary sphere or dial, and a pair of compasses. In 1481 a volume of 'S. Thomae super *Phisicam*' was bound for 14 pence; 9 pence was spent for the Reader in Natural Philosophy 'pro uno libro textuali naturalis philosophiae', and 6*s*. 8*d*. 'pro redemptione unius libri naturalis philosophiae, expositi in cista de Nelle pro caucione per M. Galfridum Recley.' And many more works on the same subject were no doubt included among the 800 volumes on all kinds of subjects, donated by the Founder on the occasion of his visit to Magdalen with King Edward IV, in September 1481. In the following year 'a certain book necessary for the common lecture in natural philosophy' was added to the collection, 20*s*. being paid to master John Bentley [Fellow] for it. (Macray, i. 10.) In 1500, Aristotle *De Animalibus* was bound.

[1] Monastic physicians, like Walter of Brakelond, were permitted to take fees (Cholmeley, *Rosa Anglica*), but contemporary representations of them do not often show them purse in hand.

In the miniatures of the Middle Ages the urine-glass was the mark of a physician of the highest rank, as the mortar was of the apothecary. My friend Dr. Singer has recently published reproductions of the medical miniatures in *Ash.* 399 *Bodley* dating from the thirteenth century showing a physician who has just performed a urinoscopy. In another picture the physician's purse is carried by an attendant. Cf. *Proc. R. Soc. Med.* ix. 1915. I have to thank Sir W. Osler for drawing my attention to this paper.

Of the Fellows of the xvth century, Hugh Ashfield left a book on Natural Philosophy to the Library, and George Epworth (*d.* 1489) appears to have had quite a valuable library for his time; it included a tractatus *de astronomia et palmistria.* Both he and William Hasard, medicus, to whom he bequeathed a book, are commemorated by brasses in the chapel. It is sad to think how few, if any, of these books now remain to us.

In the following centuries, the natural philosophers, as is apparent from the following list, were frequently elbowed out of their endowment (£6 13*s.* 4*d.* per annum) by the moral philosophers, and so it is interesting to note that even in those early days, when on 25 July, 1483, King Richard III visited the College with Waynflete, the *duae solempnes disputationes* for his delectation were in moral philosophy and in theology. *Dominus Rex magnifice et honorifice,* rewarded the philosopher, *cum uno damo et quinque marcis,* but the Reader in Natural Philosophy had to comfort himself with a fraction of two does and five marks for wine, to be shared among President and Scholars generally. 'Vivat Rex ineternum' (*Reg.* A f. 27^{b}, Macray).

Students of Medicine would then, as now, have to obtain instruction out of College; from Shagglyng Lecturers in the early days, from Regius Professors, and Linacre and other Lecturers, later on.

There is probably but little more to tell of the teaching of Natural Philosophy at Magdalen during those 'dark ages'.

We find an occasional indication that some one Fellow took an interest in scientific matters, as for instance, it is recorded that in 1490 Thomas Freer bequeathed an 'armilla', and that Robert Honiman, more than a century later, possessed a Globe and a Jacob's Staff for measuring the altitude of stars. But before rushing forward to greet the owners of these instruments as brethren in Science, we should remember the purposes to which their learning was not unfrequently strained, viz. among other objects, to trace out members of the College who had absented themselves without leave, and to discover their whereabouts,—by astrology!

We now give our list, confident that by further research some names will be struck out as being those of philosophers whose lecturing was wholly on the moral instead of on the natural aspect, but also in the hope that other names may be added, names of persons famous through achievement in some one branch of natural philosophy.

The Waynflete Praelectors of Natural Philosophy.

And of Linacre's Superior Lecturers[1] *1558–1656.*

[1477 ? **John Perch.** (A suggestion).]

1484–5. — **Flint.**

Thos: Freer bequeathed an 'armilla' 1490.

1491–2. **John Roper.** 1st Margaret Prof. of Divinity 1500. Vice-Chancellor 1505 and 11.

1494–6. **Richard Gosmere.** Supervisor of building of Tower.

1496–7. **William Hasard.**

1500–4. **William Webb.**

1504–5. **Lawrence Stubbs.** President 1525–7.

1504–6. **John Stokesley.** Princ. of Magd. Hall 1502. Bishop of London 1530. Accused of trying to discover a treasure by baptizing a cat.

1505–8. **John Mullisworth.** 'Neglected duty': Lecturer in Moral Philosophy 1507.

1506–10. **John Burgess.**

1509–11. **Robert Carter.**

1510–4. **John Maryng.**

1514–6. **Geoffrey Lee.**

1517. **Nicholas Cartwright.**

1518–9. **Anthony Molyneux.**

1518–22. **Edward Wotton,** who had studied Physic at Padua. (See p. 201.)

1521–2. **John Gulston.**

1521–2. **Thomas Starkey.**

1524–6. **Thomas Burton.**

1526. **Anthony Sutton.**

1529–31. **George Cotes.** Master of Balliol 1539.

1529–31. **John Patmore.** Fellow of Eton 1538.

1534–7. **John Patmore.**

1535. **Owen Oglethorp.** [? Mor. Phil., Macray.]

1536. **George Cotes.**

1537–40. **John Hoker.**

1538–41. **John Vicaris.** [? Moral Phil., Macray.]

[1541. **Baldwin Norton,** Reader in Geography.]

1541. **John Armstrong.**

[1] 'These appointments gradually sank to the position of College Lectureships, and ultimately sinecures held by Fellows, till the splendid revival of the foundation in the present Linacre Professorship of Human and Comparative Anatomy'. Payne.

Linacre Superior Lecturers.[1]

1542–5. **Robert Dighton.** [Macray makes Richard D. also Praelect. Nat. Phil.]

1543. At a Visitation of the University, Dr. Layton reported to Cromwell 'Pleasit your goodnes to be advertisyde that in Magdalen College we fownde stablisshede . . . two [lectures] of Philosophie, one Morale, another Naturale well kept and diligently frequentide'. *Blox.* iii. 90.

1546–8. **Richard Slithurst.**

1549–50. **John Mullins.**

1551. **Michael Renniger.**

1552. **Laurence Humfrey.**

1553. **John Piers.**

John Flower, B.A., and Barker, demy, were warned for cutting philosophical lectures.

1555. **Alan Cope.**

Th. Emley punished Nov. 4, 1555, 'eo quod non habuit librum in lectione naturali,' which punishment was no doubt so beneficial that he became Praelector in 1561.

1556. **Robert Warde.** Fellow of Merton.

1557. **Adrian Hawthorn.**

1558. Robert Barnes, Fellow of Merton.

1558–9. **Thomas Perry.**

1560. **Bartholomew Grene.** ? of Balliol.

1561. **Thomas Emley.**

1562. **Thomas Perry.**

1562. **John Day.**

1563–5. **John Kingsmill.**

1566–71. **Henry Buste, M.D.**

1566, Sept. 3. Q. Elizabeth heard disputations on Nat. Phil.

1571–2. **Christopher Wade.**

1573. **William Powell**

1574–6. **Christopher Gregorie.**

1577–8. **Isaac Upton.**

1580–4. **James Bisse.**

'Our philosophie disputations are more carelesly and lightly looked unto then in any colledge of this towne (yf there be any at all), to the great hinderance of learning and no small discredite of this Colledge. They are as yf they were not.

[1] Linacre attached his Lectureships to Merton, because that College had a great reputation among medical students. The Lecturers were obliged to explain Hippocrates and Galen to the younger students.

Linacre Superior Lecturers.

. . . J. Bisse hath kept a philosophy lecture this twelvemonth and more, not reading 2 lectures. . . . By the space of 3 quarters or there about of this last year [1584], he haith been in Parrhise [Paris] and as yet kepeth that lecture' (*Macray*, ii, p. 107).

1586–91. **William Sterrill.**

1591–2. **John Parkhurst.** Master of Balliol 1617.

1593–1606. **John Budden,** D.C.L. [Not a Fellow]. Regius Prof. of Civil Law 1611.

1604. Thomas Dochen, M.D.

1604. Henry Bust, M.D. Fellows of Magdalen.

1606–14. **Edward Othen.**

1610–11. **Thomas Mason.**

1612–13. **Vincent Goddard.**

1614–16. **Accepted Frewen.**[1]

1615–17. **Robert Hitchcock.**

1617. Bart. Warner, M.D., St. John's.

1618–30. **Christopher Collard.**

1619. Edw. Lapworth, M.D., Magdalen.

1624–27. **William Pincke,** of Magdalen Hall.

1629–33. **Henry Hammond.**

1635. John Bainbridge, M.D., Cambridge.

1631–38. **John Aubrey.** B. Phys.

1643. Edward Greaves, All Souls.

1634–40 Thomas Fox, President of College of Physicians.

1639–48. **John Cheeke.** [Expelled by Parliamentarian visitors '48.]

Henry Clerke, Demy, Praelector of Anatomy, F.R.S. 1667, President 1672, may have been one of Cheeke's pupils.

1648 — Joshua Crosse, Sedleian Professor of Nat. Philosophy.

1649. **John Duckfield,** M.A., Cantab. elected 14 Nov.

1649 Both Readers, Hobbs and Dale, were Moral Philosophers.

1654 Henry Yerbury, took his D.Ph. Padua.

[1] One of his pupils was Sir James Long (1613–5$\frac{8}{9}$). Westminster scholar; of Magd: coll: Oxon. 'great falkoner and for horsemanship; for insects; exceeding curious and searching long since, in naturall things.'

Linacre Superior Lecturers.

1650. 1650. Daniel Whistler, M.D., Merton.

1652–7. **Thomas Thackham.** 1653. Richard Lydall, Stud. Med. Merton.[1]

1653–9. **William Browne,** examiner in the Nat. Phil. School 1652. He is said to have had the chief hand in the compilation of the *Catalogus Horti Botanici Oxoniensis.*

1656. Edm. Dickinson, M.D., Merton.

1658–9. **William Hawkins.**

1661. **John Dobson** or **John Fitzwilliams.**

1662. **Daniel Hartford.**

1668. **John Fenis.**

1669–77. **Daniel Hartford.**

1678–83. **Francis Smith,** M.D.

1703 James Fayrer, a Fellow 'all guts and no brains', appointed to be Natural Philosophy Professor.[2]

1693 4^{s} 6^{d} worth of quicksilver was purchased by the College of Mag. White chimico, for their thermometer.

–1719. **Thomas Goodwyn.**

1721 John Woolhouse elected F.R.S.

1719. **Charles Holt.**

1738. **John Audley.**

H. Sibthorp, appointed Sherardian Prof. of Botany.

1747. **William Bracebridge.**

1751. **Andrew Etty.**

1765. **Francis Drake.** His 'Travels in Italy' in MS. are in Magd. Coll. Library.

1767. **Benjamin Wheeler.** Sedleian Professor of Nat. Phil. 1767–82.

G. S. Gibbes, elected F.R.S. (*Macray*, v, p. 134).

[1] Lydall had been Inferior Linacre Lecturer in 1650.

[2] 1719/20. Tuesday, Feb. 23. This morning at eight Clock, the Bell[s] at Magd. Coll. and St. Peter's in the East rung out for Dr. James Fayrer (S.T.P.) . . . Publick Reader of Natural Philosophy. He died of the Dead Palsy, in the College. He was a very proud, haughty man, of no learning, & therefore altogether unfit for the Natural Philosophy Lecture.

Feb. 26. Ch. Bertie, Fellow of All Souls, was elected Reader in the room of Dr. F. deceased, not upon account of any skill (for he hath none) in Natural Philosophy but because he is much in debt to the College, occasioned by his negligence when Bursar. . . The Electors are the Vice-Chancellor, the President of Magdalen, and the Warden of All Souls. (Hearne's *Diary*).

1804. **Edward Ellerton.**

1810. **Thomas Nixon Blagden.**

–1846. **Richard Clarke Sewell.**

1850. July 25. The following Order was passed by the College:

> A Lecturer in Natural Philosophy to be appointed, who shall devote one day at least in each week during Term to preparing pupils for passing the University Examinations, and to receive £50 annually from the Sheppard Fund.

1853. **Charles Giles Daubeny.** (*The Last Waynflete Praelector of Natural Philosophy.*)

Some lapses in the filling up of the Praelectorships had not passed unnoticed beyond the walls of the College.

On 20 March, the Radcliffe Observer, Mr. Manuel J. Johnson, made certain statements in a debate in Congregation which were reported in the *Oxford Herald*, and which reflected on the action of Magdalen in the matter of College Praelectorships. A correspondence with the President ensued, which was printed on 24 April, 1855.

President Bulley in an effective reply stated that in 1837 the College had taken steps to ensure the active working of the system, and that the elections to Praelectorships were made by the 13 senior fellows, in whom in those days the principal administrative powers were vested.

It was part of Johnson's criticism that "the Offices have been allowed to fall into disuse", to which Bulley added, "as much probably from alterations in the Educational System of Oxford, as from neglect on the part of the College." Some amusing Latin verses, satirizing the Observer, were written by Edward Stokes of Ch. Ch. (Macray).

Certainly there appear to have been considerable gaps in the succession of Natural Philosophy Praelectors during the second half of the eighteenth century, yet this very period synchronizes with the rise of perhaps the greatest inventive genius ever connected with Magdalen, one whose work has contributed materially to the industrial prosperity of England. An account of Edmund Cartwright's life has been written by his daughter[1]: we merely give a summary of it here.

[1] M. S[trickland]. *A Memoir of the Life, Writings, and Mechanical Inventions of Edmund Cartwright, D.D., F.R.S.* London, 1843.

Edmund Cartwright, D.D., F.R.S.

1743, April 24. Born at Marnham, co. Notts.
Grammar School at Wakefield.

1757. Matriculated at University College, Oxford.

1761–3. Wrote verses.
Elected Fellow of Magdalen College.

1770. *Armine and Elvira.*

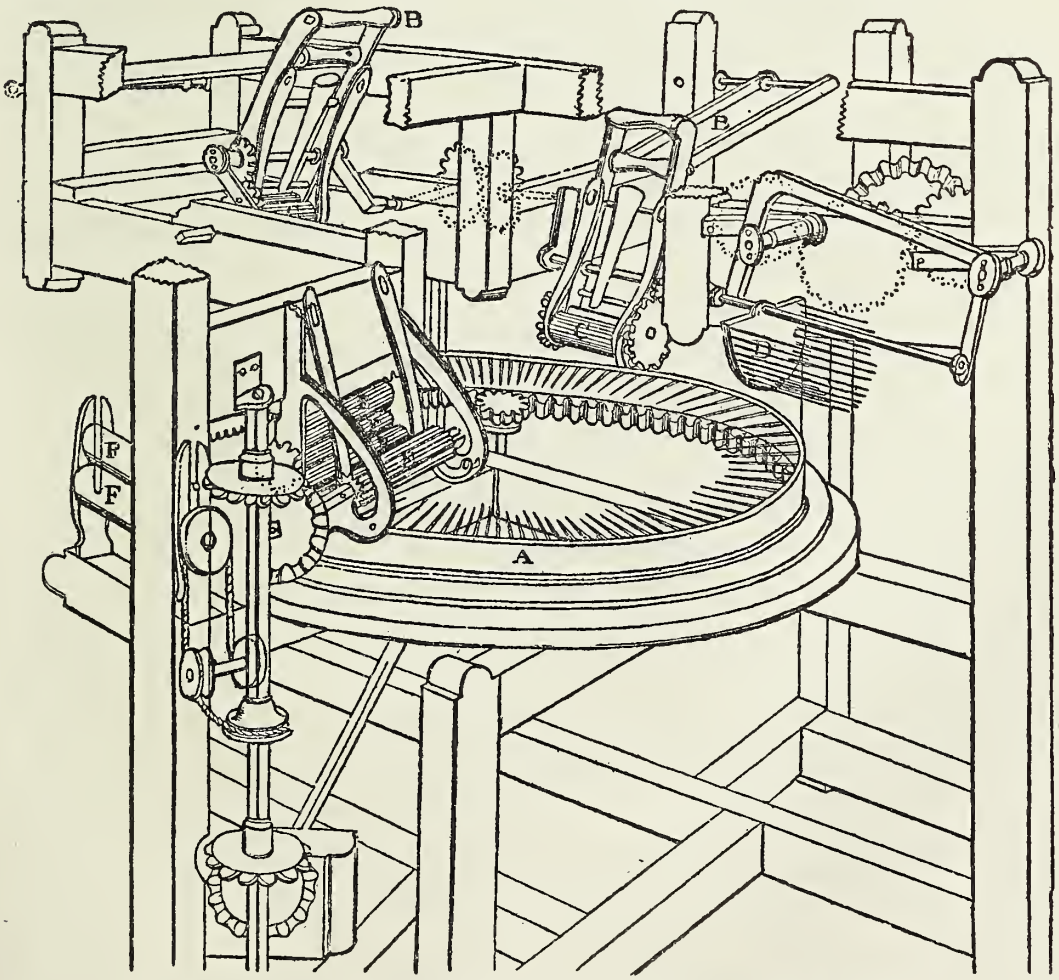
1772. Married Alice, y. da. of Richard Whitaker of Doncaster.
Presented to the perpetual curacy of Marnham.
Discovered a successful treatment for putrid fever, viz. yeast. *Cf.* Beddoes, 'Considerations on the Medicinal Use and Production of Factitious Airs.'

1779. Moved to Goadby Marwood in Leicestershire.
Contributed articles and reviews to the *Monthly Review*; e.g. reviews of 'An American Farmer's Letters', by Hector St. John, and of Dr. Johnson's 'Lives of the Poets'.

1785, April 4. First Patent for a machine for weaving (the Power Loom). Improvements in 1786, 7, 8, 90.

1785. Moved to Doncaster.

1789, Aug. 22. Patent for Wool-combing machine. (*See figure.*)



Dr. Cartwright's 'Big Ben', or Wool-Combing Machine.

1791. Messrs. Grimshaws of Manchester contracted for 400 Cartwright looms, but soon after twenty-four had been set to work, the mill was destroyed by an incendiary.

1795. Patent for grooved bricks, for building arches.

1796. Moved to Marylebone Fields, London.

1797, Oct. Patent 'for an incombustible substitute for certain materials commonly used in constructing dwelling-houses'.

Application of treadmill to working of cranes.

1797, Nov. 11. Patent for a steam-engine.

Described in the *Philosophical Magazine*, June 1798, and in Stewart's *Descriptive History of the Steam-engine*.

Correspondence with Fulton.

1798, Nov. Member of the Society for the Encouragement of Art Manufactures, &c.

1799, Oct. Candidate for post of Secretary to the Society of Arts, but withdrew in favour of Mr. Charles Taylor.

1801, March 17. Petition to House of Commons for extension of his patent-right.

June. Awarded a prize for an Essay on Agriculture.

Autumn. Appointed Director of the Duke of Bedford's Experimental Farm at Woburn.

1803. Awarded Silver Medal of the Society of Arts for the invention of a three-furrow plough.

1804. Honorary Member of Board of Agriculture.

1805. Gold Medallist of Board of Agriculture.

Paper on the efficacy of salt as a manure. *Phil. Mag.* xxiii, p. 16.

1806. Essay on Culture of potatoes.

Purchased and retired to a small farm at Hollanden near Tunbridge.

1809. Granted £10,000 by H.M. Government 'for the good service he had rendered the public by his invention of weaving'.

Experiments on the effects of sugar in fattening sheep.

1819. Endeavoured to naturalize Sumatran plants in England.

Proposal that Bank Notes should be printed on a special paper.

Cure for mildew on wheat.

Proposal for driving a locomotive carriage by man power. *Phil. Mag.* liii, p. 425.

Elected F. R. S.

1823. Invention of a gunpowder-explosion engine.

1823, Oct. 30. Died: buried at Battle in Sussex.

The Daubeny Lecture Lists

See Appendix E. (*Hist. Daub. Lab.*, pp. 65–111 and p. 197 of this vol.)

Before the end of a very few more years, those who wish to do so, will be able to celebrate the centenary of Dr. Daubeny's Inaugural Lecture, as Aldrichian Professor of Chemistry. Sufficient time has therefore elapsed to enable us to appraise the general effect of his teaching and the success in life attained by some of his hearers.

The lists made of those who attended his instruction are probably incomplete: indeed, we have heard in several cases of students who for some trivial reason avoided entering their names in the attendance book. But on the whole the lists are representative of the class of men who went to Chemical Lectures at Oxford during a period roughly coincident with the first 50 years of the life of Queen Victoria.

In the lists as printed, only first attendances are noted, so that the number of names is no true indication of the number of persons present at any particular lecture. Some keen students, like Sir Henry Acland, subscribed to an "unlimited attendance" at the Lectures on Chemistry, and no doubt repeated the course. The lists take no note of duration or frequency of attendance.

During the period of 46 years 886 names are entered, and, as many of the audience did not sign the register, we shall probably not be far wrong in estimating that quite 1,000 persons heard Dr. Daubeny's Chemical Lectures.

In such a space of time new attendances fluctuated greatly, the extremes being 2 and 96 in a year; and the numbers appear to be fairly well correlated with periods, defined by particular events. Of these events, the most important were the transference of the Chemical Demonstrations from the vaulted cellars under Ashmole's 'ample dome' to the newly built and more cheerful Laboratory by the Physic Garden in 1849, and Daubeny's resignation of the Professorship of Chemistry in 1854. Notwithstanding his resignation, and the appointment of a successor (Sir Benjamin Brodie), Dr. Daubeny still continued to lecture on Chemistry though on a restricted syllabus, and principally in relation to Agriculture, and drew considerable audiences. He also commenced the course of tutorial or catechetical Lectures on Chemistry

to Members of Magdalen College, which he continued for 13 years until his death.

Thus his lecturing activity was divided into 3 periods:

1. Professorial Lectures at the Ashmolean for 27 years. (1822–48.)
2. Professorial Lectures at Magdalen for 8 years. (1849–56.)
3. Tutorial Lectures at Magdalen for 13 years. (1855–67.)

So far as mere numbers go, the lectures may be further grouped in 5 periods, as shown in the following table:

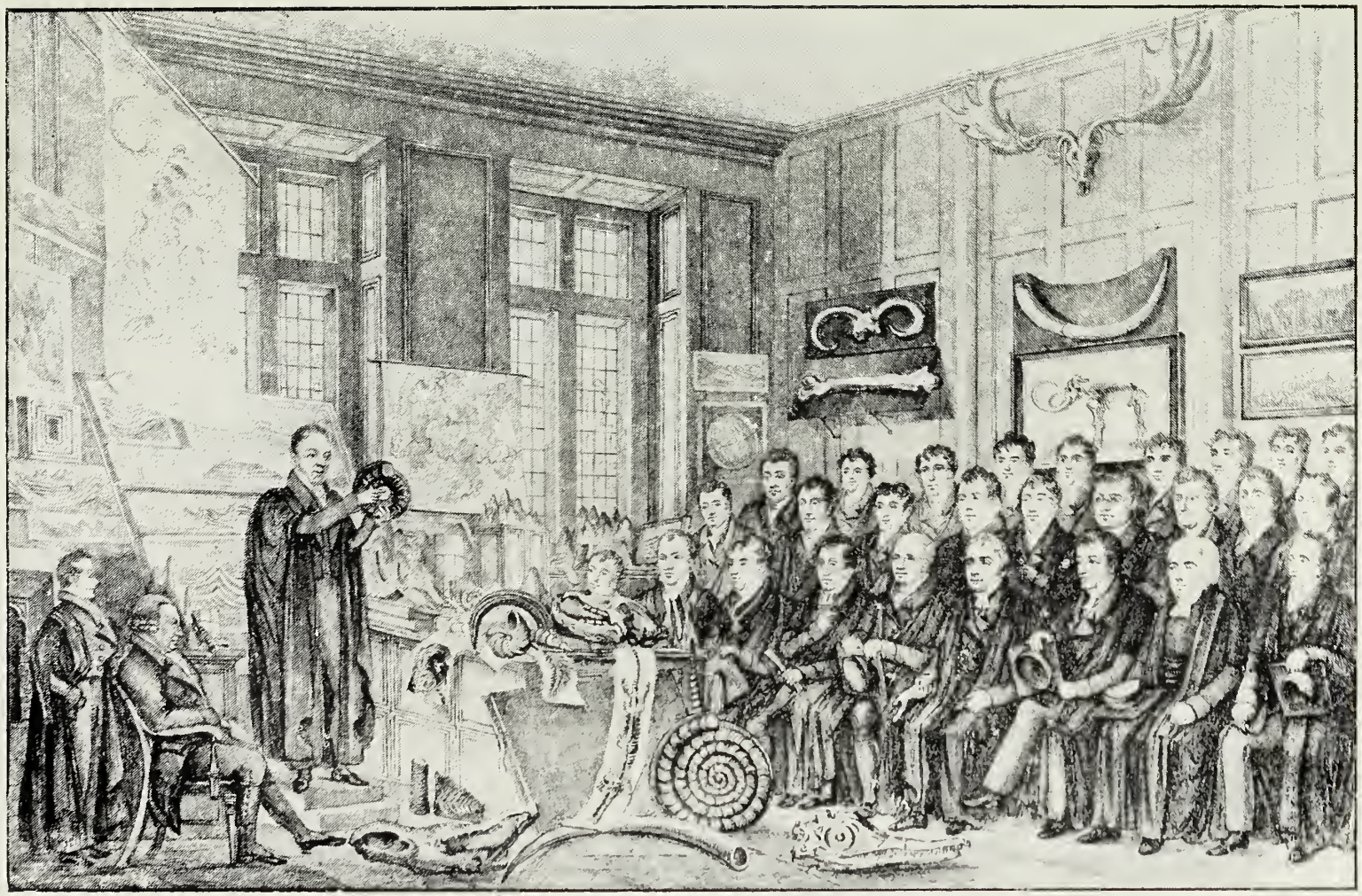
	PROFESSORIAL LECTURES				TUTORIAL LECTURES
	at Ashmolean (27 years).		at Magdalen (8 years).		at Magdalen (13 years).
Average Entry	**24** for 10 years 1822–31	**8** for 17 years 1832–48	**24** for 5 years 1849–53	**73** for 3 years 1854–56	**13** for 13 years 1855–67

The great falling-off in the numbers after the first ten years, reducing the class to one-third, was principally owing to the fact that Daubeny's earlier audiences were largely composed of resident graduate members of the University who were attracted by the interest and novelty of the subject and by the eminence of the Professor. In those days senior members of the University did not spend as much time as they do now, in attending Committee Meetings, and had in consequence more time to give to intellectual attainments. The audience at a Scientific Professor's lecture in those days differed both in age and aspect from one at the present time, as we see in the drawing of one of Buckland's Lectures at the Ashmolean, in 1822. Dr. Daubeny is one of the number.

> In Ashmole's ample dome, with look sedate,
> Midst heads of mammoths, Heads of Houses sate;
> And tutors, close with undergraduates jammed
> Released from cramming, waited to be crammed.[1]

Another reason for the falling-off in the numbers may be given. On and after 1834 Daubeny's new duties as Professor of Botany prevented him from devoting quite as much time to Ashmolean Chemistry as he had previously done: but he still retained his former interests, for in 1840 he printed a new *Syllabus on a Course of Lectures on Chemical Philosophy.*

[1] Attributed to Bp. Shuttleworth. *Fugitive Poems*, collected by Daubeny, p. 84.



A LECTURE ON SCIENCE IN 1822.

Dr. Daubeny is standing in the left-hand corner.

Reprinted from Mrs. Gordon's "Life of Buckland," with permission of Mr. John Murray.

The Classes, which had dwindled during the remainder of his sojourn at the Ashmolean Museum, increased notably after the removal to the new Laboratory at Magdalen, and again increased in consequence of the new Statute which made attendance on a course of Professorial Lectures compulsory on those who sought a degree. Principally in consequence of the operation of this statute, 96 names appear in the lecture list for 1854, and there have been those who suggested that Daubeny's course was more largely attended by undergraduates than those of other science Professors, because he lectured in the evening. But the counterfoils of the certificates of attendance at Science Lectures still preserved in the University Archives, show that Robert Walker, the Professor of Natural Philosophy, who lectured in the day-time, drew even larger classes. In fact, the full attendances of the years 1854 and 1856 had not been approached since the years 1773–7, when the average at the public lectures in Natural and Experimental Philosophy was close upon fifty. (*Daub. Lab. Hist.*, foot-note, p. 6.)

But success is not always to the big battalions; and in some of Daubeny's shorter lecture lists we find the most distinguished names. It is not given to many lecturers on Science to have taken a part in the education of a President of the Royal Society, of a President of the Chemical Society, of three Archbishops (Canterbury, York, and Dublin), of a Governor-General of Canada, and of a Lord Chancellor. But as the occasional appearance of a brilliant meteor is no sure guide to the ordered motions of the solar system, so the marked pre-eminence of an individual auditor in a lecture-list is no indication of the professions and successes of the majority of his less fortunate or less talented contemporaries. For a comparison of the careers of Daubeny's pupils with those of the scientific undergraduates of other ages, a more detailed analysis is necessary.

For this purpose we have attempted a census of those whose names appear in the Lecture Lists according to their subsequent careers. Members of some professions, e. g. the church, law, or medicine, are easy to trace, but other names, especially those of country gentlemen, are elusive and hard to use in our statistics. A large proportion of these therefore come under the heading of 'Miscellaneous' in the tables. A few landed gentry appear under the head, 'County',—a category which with better knowledge would certainly be much increased from the 'Miscellaneous'.

TABLE OF PROFESSIONS OF

	1822–3	1824–5	26	27	28	29	1830	31	32	33	34	35	36	37	38	39	1840	41	42	43
Graduates (Lay)	4	2	2	4	6	1	...	3	1	...	...	2	1	...	...	...	1	...	...	1
„ in Orders	5	6	18	15	10	6	6	7	...	...	1	2	...	...	...	...	...	...	...	4
Clergy ...	9	3	8	11	3	3	7	9	4	...	1	4	3	3	6	1	2	3	...	...
Doctors ...	3	2	4	2	...	1	1	...	1	...	1	...	3	1	1	1	...	..	...	...
Lawyers ...	2	1	2	2	...	1	...	4	1	...	1	1	1	...	1	...	2	...	1	...
F. R. S. ...	1	...	2	...	2	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...
County ...	...	...	...	3	...	1	...	4	1	...	...	1	...	1	...	...	...	...	...	1
Schoolmasters	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Civil Service ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Miscellaneous...	9	3	12	7	4	6	2	6	4	...	6	3	3	5	2	...	2	3	3	1
	33	17	48	44	26	20	16	34	12	...	10	14	11	10	10	2	7	6	4	8

TABLE OF PROFESSIONS OF

	1869	1870	1	2	3	4	5	6	7	8	9	1880	1	2	3	4	5	6
Clergy ...	9	4	...	1	...	...	3	2	1	1	1	1	...	3	1	2	3	1
Doctors ...	4	...	...	...	1	6	5	6	2	8	4	5	5	3	...	1	...	1
Lawyers ...	1	1	...	2	...	...	...	2	1	1	...	1	1	...	...	...	...	1
Science ...	5	...	...	1	1	1	...	...	...	1	1	1	1	...	3	...	...	1
Schoolmasters	5	1	1	2	...	...	1	1	2	...	...	1	2	...	...	4	...	2
Civil Service ...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
Miscellaneous	12	3	1	11	...	3	5	7	4	9	5	1	8	3	2	3	5	3
	36	10	2	17	2	10	14	18	10	20	11	11	17	9	6	10	8	9
Classes in the Schools.																		
I ...	2	1	1	3	1	...	1	3	...	2	...	2	1	2	2	2	...	1
II ...	...	...	...	1	...	2	...	1	1	...	...	2	2	...	1	1	...	...
III ...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...
IV ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Pass. ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	4	8	5

DR DAUBENY'S STUDENTS.

44	45	46	47	48	49	1850	52	53	54	55	56	55	56	57	58	59	1860	61	62	63	64	65	66	1867
...	...	1	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	...	2	1	1	8	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	5	4	5	1	3	6	22	20	38	36	20	3	5	4	3	7	3	4	7	2	4	2	1	6
...	1	...	1	...	1	1	1	2	2	...	...	...	2	...	...	...	...	1	...	...	...	...	2	...
...	3	2	...	...	1	...	2	2	13	12	10	...	1	2	1	2	4	2	1	4	2	5	3	2
1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...
...	...	...	...	2	...	2	3	1	6	1	2	...	...	1	2	1	...	1	1	...	1	...	1	...
...	...	...	...	...	...	...	...	...	3	2	...	...	...	...	...	...	1	...	3	3	3	...	...	2
...	...	...	...	...	...	...	2	1	7	1	2	...	1	1	...	...	2	...	1	...	...	1	2	...
1	4	5	2	5	3	5	15	18	26	19	20	3	1	4	3	8	2	...	4	10	6	4	2	6
3	13	14	9	10	16	14	46	44	96	71	54	6	11	12	8	18	12	8	17	19	16	13	11	16

SCIENCE STUDENTS 1869–1910.

7	8	9	1890	1	2	3	4	5	6	7	8	9	1900	1	2	3	4	5	6	7	8	9	1910
...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	2	3	2	3	1	3	1	2	2	5	...	2	...	1	1	2	1	...	2	...	...	1	3?
1	2	1	...	...	...	1	...	...	...	...	...	1	...	...	1	2	...	1	...	...	1	...	...
...	...	3	...	1	2	2	...	1	...	1	4	...	...	2	1	...	2	2	1	3	3	...	1
2	...	...	1	...	1	3	1	...	...	...	...	...	1	2	...	...	2	2	1	...	...	...	...
...	...	...	...	...	...	...	1	...	...	1	...	1	...	...	1	...	1	3	...	...	...	1	1
6	3	1	4	2	4	3	2	3	1	3	3	6	2	3	5	5	2	4	2	3	2	5	1
10	8	9	7	6	8	12	5	6	3	10	7	10	3	8	9	9	8	12	6	6	6	7	6
...	2	5	...	...	1	2	1	2	1	2	1	2	...	4	1	1	3	2	1	1	2	...	1
3	1	1	...	1	2	5	...	1	1	2	1	1	1	2	3	...	2	1	...	1	1	2	3
...	2	...	3	3	1	4	1	1	...	2	2	2	...	...	2	5	2	1	1	...	1	2	2
...	...	1	1	2	...	...	...	1	...	1	...	1	...	...	...	1	...	...	...	...	...	...	...
7	3	1	3	...	4	1	3	...	...	3	2	4	1	2	1	1	1	...	2	...	...	...	...

In the next table these figures are grouped in periods, corresponding with those suggested on p. 154.

	Years 1822–31	1832–48	1849–53	1854–56	Total 1822–56	1855–67	Total 1822–67	Per-centage
Graduates, Lay ...	22	8	1	...	31	...	31	3%
,, in Orders	73	12	8	1	94	...	94	11%
Clergy	53	42	51	94	240	51	291	33%
Doctors	13	10	5	2	30	5	35	4%
Lawyers	12	12	5	35	64	29	93	11%
F.R.S.[1]	7	5	...	4	16	6	22	2%
County	8	6	6	9	29	8	37	4%
Schoolmasters ...	1	...	...	5	6	12	18	2%
Miscellaneous ...	49	47	41	61	198	48	246	27%
Civil Services ...	...	...	3	8	11	8	19	2%
	238	142	120	219	719	167	886	99%

The first point which will strike any one familiar with the after-careers of the modern students of Natural Science is the very large proportion, about a third on the average, of the undergraduates who went to Chemical Lectures in Daubeny's day, who took Holy Orders. In 1855 more than one half of his large audience adopted the Church as a vocation. Out of his 886 auditors, 385 were either ordained or subsequently took Holy Orders, the majority becoming parochial clergy.

The numbers of men entering the same professions in more recent times are indicated in the lower table on p. 156, and may be summarized as follows:—

	Totals 1869–83		1884–93		1894–1910			Percentages
Clergy ...	27	+	8	+	0	=	35	9%
Doctors ...	49	+	17	+	23	=	89	22%
Lawyers	10	+	6	+	6	=	22	5%
Science ...	15	+	9	+	21	=	45	11%
Schoolmasters	16	+	13	+	9	=	38	10%
Civil Service	2	+	0	+	10	=	12	3%
Miscellaneous	74	+	34	+	52	=	160	40%
Totals	193	+	87	+	121	=	401	100%

The effect of the Honour Examinations.

The large and intellectual audiences who, being genuinely interested in scientific subjects, used voluntarily to hear professorial lectures at

[1] Or other first class distinction.

the beginning of the nineteenth century, were thinned by the establishment of the Final Honour Schools.[1] The men of ability who would of their own inclination have devoted much of their time at the University to becoming acquainted with the truths and principles of Science were told that the study of Natural Science was waste of time, and were coerced into concentrating their energies on matters of no other intrinsic importance, save that tutors insisted on them as being needful for winning a class in the Schools.

The Final Honour Schools were intended as a first step towards Reform, but they were engineered by one party in the university in favour of their own studies and to the exclusion of all others. It is not surprising therefore that the exclusive encouragement held out to one particular form of learning should have exerted a sinister influence upon the cultivation of all the rest.

Dr. Daubeny demonstrated the truth of this by convincing figures of the attendances on the lectures of the Professors before and after 1828.

	Average annual attendance		
	Before 1828.	After 1828.	1835–8
Chemistry (Daubeny) ...	28 ...	14 ...	10
Anatomy (Kidd)	29 ...	17 ...	8
Natural Philosophy (Rigaud)...	42 ...	10 ...	2
Geology (Buckland)	50 ...	30 ...	...
Mineralogy (Buckland) ...	30 ...	15 ...	...

In 1848, in his *Brief Remarks on the Correlation of the Natural Sciences*, Dr. Daubeny suggested the propriety of imposing attendance on two courses at least of Public Lectures during the third year of residence.

A further result of the institution of the Final Honour School was the serious falling off in the numbers of Doctors of Medicine. In 1837 there were said[2] to be only a hundred doctors in England who were graduates of Oxford or Cambridge, and Daubeny had already lamented the shortage, saying that it would soon be impossible to find an Oxford man to take the post of Physician to the Radcliffe Infirmary. Cox recollected that in the summer of 1841, Oxford was tauntingly asked why she was so slow in producing Doctors in Medicine—one or two in a year,—whilst the Senatus Academicus of Edinburgh could bring forth 103 M.D.s at one litter. "We could only

[1] Class Lists were introduced in 1807. Physical Sciences were made subjects for examination in 1849.

[2] *Quarterly Review.*

answer as the lioness did to the rabbit, 'But mine is a lion.'" (Cox, p. 322.)

A comparative study of the successes of members of the several Colleges as revealed by the Honour Lists of the School of Natural Science is not without interest. The totals are printed in the Table, with a column showing the percentage of the men who obtained First Class Honours in each College. The figures cover the period of 35 years, from 1880 to 1914, immediately preceding the outbreak of the Great War.

During the last two decades of the XIXth century, Christ Church, New College, Magdalen, and Balliol were the leading scientific Colleges, and in the number of honour men they are still well ahead of all the rest. During the last ten or fifteen years, however, honour men belonging to several of the other colleges, St. John's, Jesus, and University for example, have largely increased, though they have not, as a body, done so well in the Schools as the men from the longer-established scientific Colleges.

TABLE OF HONOURS IN SCIENCE 1880–1914.

	I		II		III		IV		Total.	Percentage of Firsts.
Christ Church ...	58	+	55	+	34	+	14	=	161	36
New College ...	46	+	61	+	36	+	18	=	161	28
Magdalen ...	52	+	42	+	39	+	11	=	144	36
Balliol	45	+	43	+	27	+	9	=	124	36
Trinity	21	+	38	+	28	+	13	=	100	21
St. John's ...	17	+	27	+	34	+	22	=	100	17
Jesus	15	+	36	+	32	+	8	=	91	16
Keble	20	+	24	+	29	+	11	=	84	23
Merton	23	+	28	+	19	+	4	=	74	31
Queen's	15	+	27	+	23	+	8	=	73	20
Exeter	10	+	29	+	23	+	11	=	73	13
University ...	8	+	23	+	23	+	17	=	71	11
Non-Collegiate...	5	+	29	+	23	+	9	=	66	7
Brasenose ...	9	+	13	+	11	+	8	=	41	22
Hertford ...	10	+	14	+	11	+	4	=	39	25
Wadham ...	8	+	12	+	11	+	3	=	34	23
Corpus	10	+	11	+	5	+	1	=	27	37
Oriel	1	+	7	+	13	+	5	=	26	4
Lincoln	2	+	9	+	6	+	3	=	20	10
Pembroke ...	4	+	6	+	7	+	3	=	20	20
Worcester ...	4	+	2	+	2	+	3	=	11	36
Total ...	383	+	536	+	436		185	=	1540	25 %

The numbers given, have moreover this peculiar interest. They show that in the Natural Science schools, taken all together, more

than fifteen hundred men took honours in 35 years, or an average of 44 per annum. Of these

25 %	obtained	I	Classes.
35 %	,,	II	,,
28 %	,,	III	,,
12 %	,,	IV	,,
100			

The statistics show the surprising result, that notwithstanding the differences of staff and of teaching methods in different Colleges, the percentage of First Classes obtained by the leading and more successful Colleges, 5 in all, are almost identical, and are slightly over 36 %—save only in the case of the small body of honour men from Corpus, whose members have been more successful than the members of any other College in avoiding the Fourth Class. Their percentage of I Class men works out at 37 %.

Whereas Christ Church and New College tie for the first place as regards total number of Honour men, with 161 each, Magdalen and Christ Church alone have obtained over 50 first classes in Science Schools. And it is noteworthy that the three leading Colleges in the percentages of firsts, Christ Church, Magdalen, and Balliol (New College, in this respect, is some way behind) are the three Colleges which have had the benefit of private laboratories for the longest period. Also, since the opening of the Laboratory at Jesus College, the success and number of the Jesus honour men have markedly improved.

The Honour men from the four leading colleges, Christ Church, Magdalen, Balliol, and New College together obtained nearly twenty more first classes than the men from all the other colleges taken together.

So far as minor 'records' go:

Magdalen is the only college which has obtained 4 first classes in two different years. Christ Church men have not appeared in the first class in 5 years only out of the 35.

New College is facile princeps in the total number of II Class men, and also holds the record for a single year (8 in 1911).

St. John's and Jesus tie in the matter of 6 III Class men in one year each, and more than a tenth of the IV Class is provided by the former college.

TABLE OF HONOURS OBTAINED BY DEMIES, EXHIBITIONERS,
Those who have advanced their science by

Classes.	1883	84	85	86	87	88	89	1890	91	92	93	94	95
Chemistry													
I	D	E	...	D	...	D	DC	...	...	E	DD	E	D
II	...	D	...	...	DC	D	...	...	D	DE	DD C	...	...
III	...	C	...	...	...	DC	...	C	CC	C	...	...	C
IV	...	...	...	C	...	...	...	C	...	...	...	...	C
Physiology													
I	...	D	...	...	...	DD	CC	...	...	...	...	...	E
II	C	...	...	...	C	...	D	...	...	...	...	...	C
III	...	...	...	...	...	...	...	DC	C	...	C CC	C	...
IV	...	...	...	...	...	...	C	...	CC	...	...	...	...
Physics													
I	...	...	...	...	...	...	...	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	...	...	...
III	...	...	...	...	...	...	...	...	...	...	C	...	...
IV	...	...	...	...	...	...	...	...	...	...	...	...	...
Zoology													
I	...	...	...	...	...	...	D	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	C	...	...
III	...	...	...	...	...	...	...	...	...	...	...	...	...
IV	...	C	...	...	...	...	...	...	...	...	...	...	...
Botany													
I	D	...	...	...	...	...	...	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	C	...	...
III	...	...	...	...	...	...	...	...	...	...	...	...	...
IV	...	...	...	...	...	...	...	...	...	...	...	...	...
Geology													
I	...	...	...	...	...	...	...	...	...	...	...	...	...
II	...	...	...	...	...	...	...	...	...	...	...	...	...
III	...	...	...	...	...	...	...	...	...	...	...	...	...
Pathology	...	...	...	...	...	...	...	...	...	...	...	...	...

COMMONERS, AND RHODES SCHOLARS OF MAGDALEN COLLEGE.
original research are indicated by blacker type.

96	97	98	99	1900	1	2	3	4	5	6	7	8	9	1910	11
...	C	...	...	...	D DD	...	...	D	D	D	D	E	...	...	D
...	...	E	...	E	D	...	...	E	...	...	...	...	E	E	...
...	...	...	C	...	...	E	CC CC	C	...	...	...	C	...	...	...
...	...	...	C	...	...	...	C	...	...	...	...	...	...	...	...
D	D	...	E	...	D	...	E	...	...	...	...	...	...	...	...
C	...	...	C	...	...	...	...	C	...	...	...	...	C	A	...
...	C	...	C	...	...	...	...	...	...	...	...	...	...	CC	...
...	C	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	D	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...
...	...	...	...	...	...	...	C	...	D	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	D	...	...	...	...	...	C	...	...	...	...	...	...	...
...	ED	...	...	...	C	...	...	...	...	...	E	...	...	...	...
...	C	C	...	...	...	...	...	...	...	...	...	...	C	...	...
...	...	...	...	...	C	...	...	...	C	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	E	...
...	...	...	...	...	...	...	...	...	...	...	...	D	...	...	...
...	...	...	...	...	...	...	...	C	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	E	...	D	R	...	...	R	...	...	...
...	...	C	...	...	...	...	...	...	C	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	C	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	R	...	...	...	...

Research Statistics.

For what is freedom, but the unfettered use
Of all the powers that God for use had given?
But chiefly this him first, him last to view
Through meaner powers and secondary things
Effulgent, as through clouds that veil his blaze.
For all that meets the bodily sense I deem
Symbolical, one mighty alphabet. Coleridge.

The table on p. 162 exhibits the comparative success of the Foundation-members (D), of exhibitioners (E), and of commoners (C) in the class lists in the case of a single College; the College chosen being naturally the one with which I am best acquainted. The years are those of the first appearance of the name in the Register. But the table is intended to be more than a mere abstract of the class lists. By the use of clarendon or black type it shows the extent to which men who have obtained honours in the Final Schools of Natural Science, have been able to do their bit by advancing their respective sciences.

The proportions of the 'researchers' or those who have published original scientific observations, to the 'non-researchers' in seven sciences are given in a condensed form in the following table:—

	Total obtaining Honours.		Non-Researchers.		Researchers.	Percentage of Researchers.
Chemistry ...	58	=	43	+	15	26 %
Physiology ...	35	=	23	+	12	34 %
Physics ...	5	=	5	+	–	0 %
Zoology ...	14	=	3	+	11	78 %
Botany ...	5	=	2	+	3	60 %
Geology ...	7	=	4	+	3	43 %
Pathology ...	1	=	–	+	1	100 %
	125		80	+	45	

The truly enormous differences between the percentages of researchers on the biological and on the physico-chemical sides, that is between the men of the wider and of the less wide preliminary education, are most unexpected and suggestive. Indeed to a certain extent these percentages may be taken as a criticism of the methods of training in vogue in the two categories of subjects.

By adding up the numbers from another point of view, in all the sciences lumped together we find that for every foundationer or exhibitioner who has brought a research to a successful conclusion, 1·2 have not, whereas for every commoner who has attempted and finished a research, 3 have not.

Notes on Appendix G.

Not least among the lessons the nation should be learning during the progress of this war is the importance of the men who can do the practical scientific work of the country. They are not so many and successors are not easy to find. Many irreplaceable lives were sacrificed in the early days owing to lack of a sense of proportion amongst those in authority, and to their ignorance of the antecedents or special qualifications of the men whose destinies they were suddenly called upon to control. It is on account of the consequent shortage of experts in many branches of science, that we now publish the bibliographies contained in Appendix G: due consideration paid to such records in the future may help to avoid wastage the country can ill afford.

The Head Masters at their conference on December 23, 1915, passed an important resolution to the effect:

'That in the opinion of this conference very grave loss to the country is caused by the employment of young students of exceptional mathematical and scientific ability as subalterns in Line battalions.'

When a student has been one of the ablest boys in a large school, has beaten the best boys from other schools in open competition for a University scholarship, when he has been one of the most promising undergraduates of his time, has ended his University career with a high class in a final honour examination, and when, more important still, has shown marked ability to advance natural knowledge, we think that a man of this stamp should not be put to serve his country in the trenches. A government that was wide awake would see to it that he was employed on work for which his exceptional abilities fit him. When in addition to these qualifications the man in question is also the possessor of inherited and therefore of transmissible qualities, his survival may be still more to be desired.

The Edward Chapman Memorial Prize for Research

Experience of the work of a College Tutor extending over the last quarter of a century has convinced me that a certain amount of research-work is of great use as supplementary to the routine work for the Science Schools, and that in a few instances it is a better form of education than the mere reading of text-books for examination. One cannot generalize for this is essentially a question of individual capacity, and each case has to be judged on its merits. Some teachers however, whose experience has given them cause to doubt whether original work as a method of training is of any value, have not hesitated to deprecate it entirely.

They now have an answer. The men who have been successful as researchers are doing work of importance in the present stress.

In 1910, with the view of commemorating the work of Edward Chapman at Magdalen and of encouraging research in one or other of the several branches of Natural Science among the junior members of the College, the subscribers to the Edward Chapman Memorial Fund founded a Prize to be given for published work in Science. The printed regulations for the prize are bound up with some twenty copies of this volume, and specimen examples of these extra-illustrated copies have been deposited in the Libraries of Magdalen College and of the Royal Society, in the Radcliffe Library, and in certain of the Libraries mentioned by the Copyright Act.

Prizemen.

1912. Thomas Field Winmill

who presented the papers listed on pp. 259–60, with another on *Asymmetric Quaternary Arsonium Compounds and their attempted Resolution.* *J.C.S.* 1912.

1914. Alan Gordon Harper

who presented the papers listed on p. 259.

Scientific Politics and Polemics

Shapes of all Sorts and Sizes, great and small,
They stood along the floor and by the wall;
And some loquacious Vessels were; and some
Listen'd perhaps, but never talk'd at all.

During the past ten years, three controversial matters, seriously affecting scientific studies, have taken up a good deal of the time of various members of the University. They are—

1. Greek in Responsions. (See p. 193.)
2. The Close-time for Scholarship Examinations.
3. Science in Responsions.

Scholarship Examinations.

The effect of the Close-time Agreement.

The table of Honours (p. 162) further demonstrates the results of a policy which has caused one of the leading scientific colleges in Oxford to shift its open competition for scholarships in Natural Science from a season and from conditions which long experience had shown to be the most favourable, to a time of year which has not been convenient and has certainly not proved a success. Science demyships at Magdalen have had an aggregate money-value of £320, and in some cases of £400 or more.[1] Two and sometimes three of these prizes are offered annually in open competition to candidates under nineteen years of age, but it has happened on many occasions that the examiners have not felt able to recommend candidates for election. To the plain man it would appear that a college offering such valuable emoluments might be permitted to hold the competition under conditions which events have shown to have produced the best candidates.

[1] By his uniform support of a policy of offering more than one demyship per annum for Science, the present President of Magdalen has gone far to realize the dream of Dr. Daubeny.

'I trust the time is not far distant, when such alterations shall be introduced into our scheme of education as will give *fair play* to the modern sciences, by rendering them integral parts of our system, or at least by holding out to their prosecution encouragements, in the shape of prizes and scholarships, similar to those now afforded to a proficiency in classical, and even in oriental literature; I flatter myself, it will be found, that the faculties of youth will be as much improved by an attentive study of the truths of experimental science, and of those methods of research, by means of which these truths have been arrived at, as they have hitherto been by that of the most approved models of Grecian or Roman Philosophy.' Daubeny, *Atomic Theory*, 1831, p. vii.

But to preserve the *status quo* did not recommend itself to minds bent on remodelling. The schemes at first were drafted exclusively in the classical interest; many of the contracting Colleges and their representatives did not even know that Science would be involved. Various considerations were advanced by the reformers: the examination should be held at a season to suit schoolmasters, some of whom had never sent up a successful candidate;[1] held moreover in a way which no group of Colleges at Cambridge could consider competitive; and at a time convenient to any other College that might be examining with Magdalen; in effect at any time but that which had yielded an unfailing succession of good elections.

It is impossible to admit so many claims, and yet remain true to the interests of College and of Science. Interference with the old method of selection has brought it about that Magdalen is no longer in the position of being able to produce her due proportion of scientifically trained men. The shortage is particularly marked in the case of medical men. Under the new régime medical student demies have been reformed out of existence; and as frequently happens in a school, with the disappearance of the best there has been a numerical falling off in the rank and file. It is a peculiar irony of fate that this, for Magdalen ill-starred reform, should have been made just when our medical school was in so flourishing a condition that Magdalen men gained Radcliffe Travelling Fellowships three years in succession. This was justification enough, were any needed, for letting well alone.[2]

Science in Responsions.

In the last decade the question was mooted as to whether persons coming to the University to study the Liberal Arts should be required to have some acquaintance with elementary natural science.

The subject was brought to a head by a letter of January 21, 1904, from Sir Archibald Geikie and Mr. Larmor, secretaries of the Royal Society, to the Universities, which expressed the strong conviction of

[1] Some of the schoolmasters who agitated for the close-time appear to have been in need of the excellent advice offered by Mr. *Punch* to a prominent Head Master, when he in 1915 tried to teach the government how to manage 'Gibs and Kiels and Kaisers', after the defeat of Germany:

Let schoolmasters observe the wholesome rule
Of sticking closely to their job and school.

[2] Some of the results of the present system were stated in a letter entitled *College Scholarship Examinations*, which is appended to the collection of papers at the end of the few extra-illustrated copies of this volume.

the President and Council of the Royal Society that it was in the power of the Universities 'to confer most substantial benefit on the nation' by taking steps to 'ensure that the knowledge of science is recognized in schools and elsewhere as an essential part of general education'.

Many people had already realized the need for a wider knowledge of elementary science at Oxford, for ignorance of the laws of nature even among some who were considered well educated, was startling.

Memorials were addressed to the Hebdomadal Council of the University to urge the desirability of giving an effectual reply to the letter of the Royal Society by requiring some knowledge of Natural Science in the Entrance examination and in any other examinations which the University might adopt in lieu of the same. One plan was that a compulsory paper on natural science should be substituted for the arithmetic paper in Responsions; and as complaints had been made of the illiteracy of many of the candidates, it was suggested that the Masters of the Schools should require lucidity and correct expression in the answers.

As the introduction of such an examination into Responsions would be a new departure, for which the teaching in many schools might be inadequate, it was intended that the examination should be easy at first, and that the standard should be gradually raised. When in May, 1906, I was privileged to give evidence before a Committee of Council, I proposed the adoption of a draft syllabus on the following lines,—a selection of matters with which an educated man ought, in my opinion, to be acquainted.

Draft Syllabus for Science in Responsions.

Elementary *astronomical* facts relating to the Solar System, to the Motions of the Earth and to the apparent Motions of Sun and Moon.

Elementary *physiographical* facts relating to Latitude, Longitude and Time; the Seasons; Gravitation; Tides; Atmosphere; Winds; Temperature and Pressure; Ocean Currents.

Mechanics: The Laws of Motion. Levers. Laws of falling Bodies. Boyle's Law. Barometer. Pressure of columns of Liquids.

Heat: Expansion; Thermometry; Transference of Heat by Conduction, Convection and Radiation.

Chemistry of the elements of Air, Water and Carbon dioxide.

Biology: Metabolism and Respiration of Animals and Plants.

The scheme was quashed by the Hebdomadal Council, partly by

those who desired no change in Responsions, but partly also it must be said on the representation of one or two scientists in Oxford who declared themselves against what they termed 'smattering', especially in their own department.

A smattering of science may be more useful than many of the quips and cranks which examinees are so frequently told to get up. Numbers of our students ultimately find their way into Government offices, where in control of the practical affairs of the nation their ignorance may and often does do real harm. Indeed the vacuity of some jacks-in-office is evident every day. To give but a recent instance culled from the *Times* of February 2, 1916: when 'Turned-down' wrote to a Government office to suggest that the striking of church bells should be stopped in London because they might guide air-raiders, he received a nicely worded letter to the effect that the authorities did not think such a step necessary. The step was taken months later!

That charcoal or garden soil will absorb gases like chlorine is a fact well known to many who have only a slight smattering of Chemistry. Such knowledge widely spread might have saved many lives from gas-poisoning in the trenches.

What men of learning think to-day, the public will think to-morrow, but sometimes to-morrow is unfortunately a very long way off. We recall with pleasure that as far back as seventy-five years ago, Dr. Daubeny anticipated the strictures in the press of 1916 on the inadequacy of the scientific education of Oxford men. He wrote, February 11, 1840: 'It would be proper . . . to insist on a certain elementary knowledge of the fundamental law of mechanics and of chemistry, if not from every graduate, at least from every one who leaves the University with the sanction of its highest honours. The same principle, in short, which in the sister University denies every kind of literary distinction to those who have not attained a certain amount of mathematical knowledge, ought surely to prevent our sending into the world, furnished with our highest credentials, persons, who for aught we know, might leave us in the most profound ignorance of the nature of Gravitation, and of the constitution of the very Atmosphere which we breathe.'

Roger Bacon had held and expressed similar views, and were he living now would say that without natural science 'nothing worth knowing in philosophy can be attained'.

About 1856 a Committee of the British Association reported:

'It is melancholy to see the number of Oxford Graduates who do not

know the elementary principles of a telescope, a barometer, or a steam-engine. The contempt of anything manual or mechanical, which Bacon so strongly reproved, still prevails to a large extent among the upper classes.' The standard is not very different now.

To quote one of Dr. Daubeny's successors in the Chemistry chair, who was contrasting English and German Chemistry: 'There cannot be any doubt that the manufacturer of organic colouring matters during the critical years 1870–80 was, owing to the neglect of organic chemistry by our universities, placed in a very difficult and practically impossible position.'

'If the record of our universities is examined, it is at once obvious that many of those famous places, and more particularly the Universities of Oxford and Cambridge and the Scottish Universities, contributed practically nothing to the advancement of organic chemistry during the latter part of the last century.' Prof. Perkin, *Presidential Address to the Chemical Society*, 1915.

But then we should always remember that the best German brains were available for organic chemistry, whereas a large proportion of ours go out to govern India.

But it should not be thought that Oxford is the only place where scientific studies are less diffused than they should be. According to a *Times* report of January 7, 1915, Mr. J. Young stated that 'Sandhurst had the honour of being the only military college where science was absolutely ignored'.

How conservative is the Army! The same was being said in 1849, when Dr. Robinson in his Presidential Address to the British Association gave the following instance:

'The head of a great military department once said that he hated scientific officers! Any one of his officers could have told him that more money had been wasted and lives lost in that department, from sheer ignorance of science, than any one could think of without shame and sorrow.' In the same Address we read that a general officer is reported to have asked, 'Of what use is science?'

APPENDIX A

The Meteorological Record.

Study, O study the chart in the paper
Look at the glass and be guided by that!

Godley.

The daily observations of the atmospheric pressure, temperature, and humidity of the rainfall and wind, and of the height and temperature of the River Cherwell have been continued without a break. Indeed, on at least one occasion, lacunae in the meteorological record kept at the Radcliffe Observatory have been filled by a comparison with the Record kept at the Daubeny Laboratory.

Owing to the war the Tables of mean monthly observations are not printed in this volume, but the daily readings may be consulted in the Record books at the Laboratory, and annual summaries of the observations will be bound in with some 20 copies of this book.

The heaviest annual rainfall, 30·86 inches, occurred in 1912, the heaviest fall in 24 hours being 1·76 inches on October 11, 1910.

The highest air temperature recorded was $91\frac{1}{3}^{\circ}$ in the shade on 9 Aug. 1911, and the lowest minimum thermometer (exposed) was $4\frac{1}{2}^{\circ}$ on 29 Dec. 1908.

The highest and lowest mean monthly temperatures of the Cherwell were 68·1° for July 1911, and 36·4° for Feb. 1909 and Jan. 1914. The yearly means of the river varied from 52·35° in 1911 to 49·2° in 1912.

The Barometer has again been moved to the practical Physics room on the ground-floor. The correction for sea-level applied to all readings is now +·2, instead of +·221 when the instrument was on the upper floor.

APPENDIX B

RESEARCHES CARRIED OUT IN THE DAUBENY LABORATORY DURING 1903–14; WITH TITLES OF PUBLICATIONS BASED THEREON.

We may be justified in hoping . . . that the State will recognize in Science one of its elements of strength and prosperity, to foster which the clearest dictates of self-interest demand.

H.R.H. PRINCE ALBERT, *Golden Precepts.*

Separate copies of most of these papers have been bound up with 20 copies of this volume.

The results of about a score of earlier researches have been recorded in the *History* of the Laboratory (Appendix B, pp. 48–50).

In addition to the further list of completed researches printed below, we may note that the Laboratory was used for—

The determination of the Electrical Conductivity of Iodic Acid, by Dr. M'Lachlan.

Work preliminary to the measurement of the Specific Resistances of pure anhydrous Acetic Acid, and the two next higher homologues, at their own boiling-points. By Mr. Lambert in vacations of 1904–6.

Experiments on a yellow ether isomeric with the colourless methyl ether of ortho hydroxy meta methyl benzophenone. By Mr. Moore, 1906.

Research on Air-testing Appliances. By Mr. D. R. Wilson, H.M. Inspector of Factories, in 1909.

Mr. Manley also devoted some time to inventing a Splash Guard for the Motor Buses of Oxford, which are a serious nuisance to pedestrians and shopkeepers, when the roads are muddy. The invention proved efficient, and so a Provisional Specification for a Patent, No. 2962 (24 Feb., 1915), was filed. Unfortunately, the invention was found to have been forestalled by Mr. Catling's Patent, No. 7465 of 1912. An annular flap is used for preventing mud from splashing sideways.

1903.

19. **J. J. Manley.** Chlorine Titrations of 162 samples of Sea-Water collected at various depths in the Faeroe-Shetland Channel between May 1900 and June 1902.
Published by H. N. Dickson in *The Hydrography of the Faeroe-Shetland Channel. Geographical Journal*, April 1903; and in *Memoirs of the Challenger Society*, No. 1, pp. 95–6.

20. **J. M'Lachlan.** Hydrogen Peroxide.
Sm. 8vo, Bristol, 1904.

1905.

21. **V. H. Veley and Manley.** The Refractive Indices of Sulphuric Acid at different concentrations.
Proc. Royal Soc. 1905.

22. **N. V. Sidgwick.** Note on the Interaction of Metallic Cyanides and Organic Halides.
Proc. Chem. Soc. p. 120, 1905.

1906.

23. **R. T. Günther.** [Identification of Species of] Porifera. 'The Wild Fauna and Flora of the Royal Botanic Gardens, Kew.'
Kew Bulletin, Addit. Ser. v, 1906.

24. **E. G. Hill.** The Hydrolysis of Ammonium Salts by Water.
Trans. Chem. Soc. pp. 1273–89.

1907.

25. **Sidgwick and Moore.** Zur Dynamik der Tautomerie.
Zeit. für physikalische Chemie, lviii, 3, 385–408.

26. **T. S. Moore.** The Equilibrium in Aqueous Solutions of Amines, pseudo-acids and pseudo-bases, and Lactones.
Trans. Chem. Soc. xci, p. 1375.

27. **T. S. Moore.** The 'True' Ionization Constants, and the Hydration Constants of Piperidene, Ammonia and Triethylamine.
Trans. Chem. Soc. xci, p. 1379.

28. **R. T. Günther.** Die Stellung der Chaetognathen im System.
Zoologischer Anzeiger, xxxii, pp. 71–2.

29. **R. T. Günther.** The Chaetognatha, or Primitive Mollusca.
Quart. Jour. Micr. Science, li, pp. 357–394.

30. **R. T. Günther.** Zoological Results of the Third Tanganyika Expedition, conducted by Dr. W. A. Cunnington, 1904–1905. Report on Limnocnida tanganicae; with a note on the Subspecies from the Victoria Nyanza.

Proc. Zool. Soc.

31. **J. J. Manley.** On the Application of a Differential Densimeter to the Study of some Mediterranean Waters.

Proc. Royal Soc., Edinburgh, xxvii, pp. 210–32.
Cf. Sir John Murray, *The Ocean*, p. 22.

32. **E. G. Hill.** The Electric Conductivity and Refracting Power of Ninety Samples of Sea-Water and a Comparison of these with the Salinity and Density.

Proc. Royal Soc., Edinburgh, xxvii, pp. 233–43.

1908.

33. **Sidgwick and Tizard.** Colour of Copper Salts in Solution.

Trans. Chem. Soc. xciii, p. 187, 1908.

34. **Sidgwick and Tizard.** The Initial Change of the Radium Emanation.

Trans. Chem. Soc. xciiii, p. 957, 1910.

1909.

35. **Sidgwick and Moore.** Rate of Reaction of the Triphenylmethane Dyes with Acid and Alkali. Part II. Brilliant-Green and Malachite-Green.

Trans. Chem. Soc. xcv, pp. 889–98.

36. **Sidgwick and Rivett.** The Reaction of Diaminotriphenylcarbinol with Acid and Alkali.

Trans. Chem. Soc.

37. **J. J. Manley.** Chlorine Titrations of 139 Samples of Sea-Water collected in the N. Atlantic during 1903 and 1904, on board Dr. Wolfenden's Yacht *Silver Belle*.

Published by Wolfenden in *Scientific and Biological Researches in the North Atlantic*, pp. 109–26; *Memoirs of the Challenger Society*, No. 1, 1909.

1910.

38. **Sidgwick.** The Solubility of Organic Acids and Bases in Solutions of their Salts. Preliminary Note.

Proc. Chem. Soc. p. 60, 1910.

39. **Sidgwick and Tizard.** The Colour and Ionization of Cupric Salts.

Trans. Chem. Soc. xcvii, pp. 957–72.

40. **Rivett and Sidgwick.** The Rate of Hydration of Acetic Anhydride.

Trans. Chem. Soc. xcvii, pp. 732–41.

41. **Rivett and Sidgwick.** The Rate of Hydration of Acid Anhydrides, Succinic, Methylsuccinic, Itaconic, Maleic, Citraconic, and Phthalic.

Trans. Chem. Soc. xcvii, pp. 1677–86.

42. **Manley.** Observations on the Anomalous Behaviour of Delicate Balances, and an Account of Devices for increasing accuracy in Weighings.

Abstract in *Proc. Royal Soc.* lxxxiv, p. 389; *Phil. Trans.*, ccx. pp. 387–415.

1911.

43. **Sidgwick, Pickford, and Wilsdon.** Solubility of Aniline in Aqueous Solutions of its Hydrochloride.

Trans. Chem. Soc. xcix, pp. 1123–32.

44. **Sidgwick and Wilsdon.** Conductivity and Viscosity of Aqueous Solutions of Aniline Hydrochloride at 25°.

Trans. Chem. Soc. xcix, pp. 1118–22.

45. **E. G. Laws and N. V. Sidgwick.** Isomeric Acetaldehydephenylhydrazones.

Trans. Chem. Soc. xcix, pp. 2085–93.

1912.

46. **J. J. Manley.** On the Observed Variations in the Temperature Coefficients of a Precision Balance.

Proc. Royal Soc. lxxxvi, pp. 591–600.

47. **J. J. Manley.** On the Apparent Change in Weight during Chemical Reaction.

Abstract in *Proc. Royal Soc.* lxxxvii, pp. 202–4.
Complete paper in *Phil. Trans.* ccxxii, pp. 227–60.

48. **J. J. Manley.** Analyses of Green and Blue Glass from the Posilipan Mosaic.

Archaeologia, lxii, pp. 106–8.
Partly reprinted in Günther's *Pausilypon*, pp. 289–91, 1913.

49. **Moore and Winmill.** The State of Amines in Aqueous Solution.

Trans. Chem. Soc. ci, pp. 1635–76.

50. **Moore, Somerville, and Derry.** The Velocity of Reaction between Potassium Chloroacetate, and some Aliphatic Amines.

Trans. Chem. Soc. ci, pp. 2459–67.

1913.

51. **N. P. Campbell.** On the Application of Manley's Differential Densimeter to the Study of Sea-Waters on board ship.

Proc. Royal Soc., Edinburgh, xxxiii, pp. 124–36.

52. **Wilsdon and Sidgwick.** The Rate of Hydration of Acid Anhydrides: acetic, propionic, butyric, and benzoic.

Trans. Chem. Soc. ciii, p. 1959.

1914.

53. **Moore.** Asymmetric Tervalent Nitrogen.

Proc. Chem. Soc. xxx, pp. 182–4.

1915.

54. **Wilsdon and Sidgwick.** Rate of Hydration of Camphoric Anhydride.

Trans. Chem. Soc. cvii, p. 679.

55. **C. H. Manley.** Chemical Analysis and Refractive Indices of Leamington Spa Water.

[In preparation for publication.]

The papers may be grouped as follows :—

Refractive index of Sulphuric Acid.
No. 21.

Rates of Reaction of Triphenyl-methane Dyes with Acid and Alkali.
Nos. 25, 35, 36.

Equilibrium in Aqueous Solution of Amines.
Nos. 26, 27, 49.

Colour of Copper Salts in Water.
Nos. 33, 39.

Rate of Hydration of Acid Anhydrides.
Nos. 40, 41, 52, 54.

Solubility of Aniline in Aqueous Solution of its Hydrochloride.
Nos. 43, 44.

Differential Densimeter.
Nos. 31, 51.

Accurate Use of the Balance.
Nos. 42, 46, 47.
Not strictly experimental.
Nos. 22, 26, 34.
Zoological Papers.
Nos. 23, 28, 29, 30.
Sea-Waters.
Nos. 19, 31, 32, 37, 51.

The analyses of sea-waters by the Daubeny Curator have an especial domestic interest, because it is a subject in which Dr. Daubeny was himself greatly interested. On May 22, 1837, and on November 26, 1838, he described an Instrument for obtaining Specimens of Water from considerable Depths, and wrote on the varying Specific Gravity and Saltness of the Sea at different Depths. In modern practice, salinities of sea-waters are computed from chlorine contents by Knudsen's Hydrographical Tables.

In Mich. Term 1915, in the second year of the war, a letter, dated 21 Oct., 1915, was received from the Advisory Council of the Committee of the Privy Council for Scientific and Industrial Research requesting information on researches in progress, and the amount of funds available to meet the expenses connected with them. The answer to the latter question was simple. The Daubeny Laboratory has never had any 'endowment for research'. The cost of the upkeep of the buildings, the rates and taxes and a half-share of the cost of gas, water, and heating have been borne by Magdalen College, but the expense of the greater part of the researches has been borne by persons of slender incomes, whose devotion to their respective sciences would have led them to make greater sacrifices if the opportunity had presented itself. There is no doubt that even a small annual grant in aid of research would have increased the output of original scientific work done in the Laboratory,[1] and in the future 'after the war'

[1] It may perhaps be mentioned that in 1903 the Daubeny Laboratory account was able to make a payment of £50 to the Corporate Revenues of

private incomes on a revised scale may no longer permit of personal sacrifices.

The work of Messrs. Sidgwick and Moore was helped by grants of some £50 (1909–10) from Magdalen College, and by others from the Royal and Chemical Societies. The College also made grants of £10 in 1905 for the work of Mr. Hill, and of £15 in 1909 for that of Mr. Laws.

But Mr. Manley, beyond a box of resistance coils and a platinum-iridium wire obtained by a grant from the Royal Society in 1897, has had no external assistance for any of his numerous and valuable researches, though they have required exceptionally delicate and costly instruments.

In answer to the first question of the Research Council, relating to the researches actually in progress, or carried out in recent years, the following (by J. J. M.) were mentioned :—

1. The composition and manufacture of glass for chemical apparatus.

   This work has been dropped. A method for the manufacture of soft soda glass was almost completed : from this it was proposed to proceed to trials of methods for the manufacture of Jena and of other glasses.
2. Determination of the approximate limits of variation in the electric resistance of the plugs of standard resistance coils, and a device whereby such resistances can be made small and practically constant. (Almost completed.)
3. A new high-speed electric alternator of non-variable resistance. (Almost completed.)
4. Two new forms of pyknometer and a comparison of the relative merits of some pyknometers in general use. (Almost completed.)
5. Determination of the specific heats of certain liquids by a method of cooling, the range of cooling being from one-tenth of a degree to five degrees centigrade.
6. Measurement of the electric constants of exceeding fine platinum wires, together with a new form of platinum

the College, out of profits made by the course of Physical Chemistry, which had been started with apparatus furnished under a College Order of 1900.

thermometer capable of indicating $\frac{1}{10000}$° C. (Almost completed.)

7. A new precision balance for the accurate determination of the relative densities of gases. The volume of the gas used is from 100–200 c.c. only.
8. A new method for the purification of phosphorus-pentoxide used in connexion with the production of high vacua. (Almost completed.)
9. Some new mercury compounds obtained by an electrical method.
10. A method for the preparation of 100% nitric acid. (Recently commenced: the results are successful from the purely scientific, though not so from the commercial, point of view.)
11. A research conducted with the object of discovering a method for the nitrification of cellulose without the aid of sulphuric acid.
12. Experiments to test Boyle's Law at low pressures.

It is obviously undesirable for a man engaged in successful research to have to go the round begging for funds to enable him to carry on work that he is doing for the common good, and upon which not only the scientific reputation of his University, but in some cases the wealth or safety of the whole country, may depend. Persons who are at all sensitive in these matters simply do not beg, but prefer to leave the work undone. The only satisfactory manner of endowing research is to place a sum of money and leisure at the disposal of the worker for the express purpose of his research, which he may draw upon, with due safeguards, as required.

APPENDIX C

THE COLLECTIONS OF APPARATUS.

Such as queer-looking bottles and jars in a row,
Retorts, crucibles, such as all conjurers stow.

The principal acquisitions have been :—

1904. Apparatus for teaching Preliminary Physics purchased from Mr. E. S. Craig when the Physics Laboratory at Keble College was given up.

Physical Apparatus purchased from Mr. F. Jervis Smith when he retired from the Millard Laboratory.

Amsler's Planimeter.

1907. A Fuller's Calculating Slide Rule.

A 100-gramme Standard Weight. By Paul Bunge.

This weight was tested by the Normal Eichungs-Kommission at Charlottenburg on Oct. 1, 1907. Its mass was certified to be 100 grm. $-\cdot 04$ milligrm. (correct to the nearest $\frac{1}{100}$ milligrm.). Volume at 0° was 4·64 ml. Its official mark is K. N. E. K. $\frac{27}{07}$.

This weight has a particular value because not only have Mr. Manley's own refined weighings been made with weights standardized by it, but also the weights used by Messrs. Appleby, Baker, Hartley, Moore, Rivett, and Sidgwick in their recent researches have all been standardized by comparison with the same standard. So that practically most of the accurate weighings made in Oxford in recent years depend upon this 100-gramme weight.[1]

This same weight has also acquired Imperial importance by being the parent of standards used

[1] An article in the *Daily Graphic* for June 26, 1913, quotes Lord Kelvin to the effect that 'nearly all the grandest discoveries of science have been the reward of accurate measurements and patient, long-continued labour in the minute sifting of numerical results', and mentions, with approval, as examples, the work of the National Physical Laboratory, of Prof. Hecker at Potsdam, of Boys, the Earl of Berkeley, and Manley at Oxford.

in the British Dominions beyond the Seas, for a set of weights now used in the University Laboratory at Melbourn was standardized by comparison with this weight by Mr. Rivett.

'Omega' Stop-watch Chronometer.

Metre Bridge with Platinum Iridium Wire.

1910. Short-beam Balance by Bunge.

Two copper Thermostats.

A set of Paul's Manganin Resistance Dial Coils.

$\frac{1}{10}$th Horse-power Electro-motor and fittings.

4 Accumulators.

1903, Nov. 13. Permission to obtain duty-free spirit was obtained from the Inland Revenue authorities, Somerset House.

1911. A Screw-cutting Lathe, deposited on loan by Mr. H. W. M. Willett has been a most valuable acquisition in many ways.

Loans.

An accumulator was lent to the late Dr. Jenkinson at the Museum. (Returned.)

Two polarimeters are on loan to Prof. Moore at Holloway College.

A quantity of mercury was lent to H.M. Inspector of Factories, Mr. D. R. Wilson. (Returned.)

Stop-watch and Slide Rule are on loan to Mr. Sidgwick.

Chemical Glass.

Among the apparatus which Dr. Daubeny bequeathed to Magdalen there is a good deal that carries us back to the chemists of a very early period, indeed some of the larger and coarser of these old pieces almost suggest the alchemist's cellar; certainly they would be more in keeping with it than with the delicate glass-work of present-day laboratories with their modern fittings-de-luxe for gas, electric current and high pressure water. True Dr. Daubeny left us no black cat, or stuffed crocodile pendant from the ceiling, but of earthenware retorts, clay crucibles, alembics, and other distillatories there

are plenty. And we owe it to the bountiful supply of cupboards and out-of-the way hiding-places which he provided to his building that all this old glass-ware has escaped breakage.

The provenance of the individual pieces in this miscellaneous collection is doubtful, nevertheless they lead our thoughts back through the epochs of Sir Humphry Davy, of Priestley and Lavoisier, perhaps even to the great days of Boyle and of Mayow, the discoverer of oxygen.

Part of the collection of old glass is now displayed in showcases.

In many modern schools of Science a knowledge of the development of practical methods, of the construction and use of appliances and apparatus, and of the mechanical means whereby advance has been effected, have formed for some time an essential part of a proper scientific education.

Later investigators can never completely follow the work of their predecessors, without an exact knowledge of the materials and the methods employed by them. Book descriptions seldom do full justice to the difficulties of the work of pioneers.

Early instruments for physical experiments that are of sentimental interest, of fine workmanship, or of artistic merit, are treasured in many cabinets in the centres of learning of Europe, and many are still in working order. But in Chemistry the conditions of research are so different that the demonstration of early chemical methods with contemporaneous apparatus and materials is by no means easy.

With what interest chemists of the present day would visit the laboratories of Lavoisier, of Cavendish, or of Priestley, if we had them with all their apparatus intact. Even the mysterious achievements and unintelligible gibberish of the alchemists would become clear if we could analyse their materials anew, and translate their formulae into our own language.

But chemicals and reagents flow through a chemical laboratory like water in a river, the soiling and breakage of glass-work and crockery is incessant, metal-work corrodes, and parts of apparatus, that have served a turn but are now worn out are continually being refashioned into new. Even

glass vessels suffer a peculiar degradation that renders them unfit for their purpose. And thus it was found, when an attempt was being made to form a national collection of scientific apparatus at South Kensington, that glass-ware used by early chemists was exceedingly rare, and that samples of their reagents and preparations are wellnigh unobtainable.

To illustrate the progressive history of Science no one collection will ever be sufficiently comprehensive; it is therefore essential that all early oddments of apparatus scattered about the country, should, by being listed, be made accessible to students. With this intention the following reprint of the explanatory labels referring to some of the early chemical apparatus in our Laboratory is appended.

Apparatus for the Production and Application of Heat.

The French fourneau à réverbère. c. 1818.

Known in Germany as Becher's Furnace. Thénard, *Traité de Chimie*, Pl. vii, 1818.

Cooper's Tube Furnace for the Analysis of Organic Bodies. c. 1828.

Combustions were effected in glass tubes coated with a spiral wrapping of copper foil. Gray, *Operative Chemist*, p. 295, fig. 178, 1828.

Combustion Tube of Berlin Porcelain, for use with ditto.

Newman's Blowpipe. 1816.

Designed to obviate the difficulty of blowing with the mouth. It was used with compressed gases as the first oxy-hydrogen blowpipe.

Gurney's Oxy-hydrogen Blowpipe. 1823.

Gray, *Operative Chemist*, p. 103, fig. 64.

Distillation.

Retorts.

Retort of Berlin Porcelain, with loose head to be fixed with wire and cement, for the preparation of Ammonia, &c. Griffin, *Chemical Handicraft.*

Retorts of Yellow glazed Stoneware. One Plain. Two tubulated. c. 1828.

'For dephlegmating oil of vitriol, distilling ether, and many other such occasions, the retorts may be made of the substance of which the pots, &c., commonly called stoneware, are formed.

'They may be obtained at the stone manufactories, at an expense but little exceeding that of glass; and they afford by their durability a great saving compared to glass, where much business is done.'

Gray, *Operative Chemist*, p. 274, 1828.

Retort of Green Glass, tubulated.

'For ordinary purposes, retorts of green glass are used, either placed in baths, or coated and used in a naked fire; but for some purposes flint glass retorts are obliged to be used.' Gray, *Operative Chemist*, p. 274, 1828.

'In consequence of the excellence and present cheapness of the Retorts made of hard white German and Bohemian glass, those of green glass have been omitted from the Catalogue.' Griffin, *Chemical Handicraft*, No. 1805.

Retorts of French Fireclay with long tubulures.

Cornues en grès vernis de la fabrique d'Orléans.

Griffin, *Chemical Handicraft*, No. 1834.

Pear-shaped Bodies with ∽-shaped tubular Receivers of thick glass.

RECEIVERS.

∽-shaped tubular Receivers of thick glass.

ADAPTERS.

'In some simple distillations it is necessary to interpose an adapter between the retort and receiver. This may serve two different purposes; either to separate two products of different degrees of volatility, or to remove the receiver to a greater distance from the furnace, that it may be less heated.' Lavoisier, *Elements of Chemistry, Kerr's Translation*, p. 464, 1793.

ALEMBICS.

Two Alembic heads with ground stoppers.

One Alembic head and body complete.

'Les Alambics de verre sont formés de deux parties, de la cucurbite et du chapiteau. Ils s'emploient ordinairement au bain de sable.' Thénard, *Traité de Chimie*, 1818.

'The capital, both of the cucurbit and alembic, has a furrow or trench intended for conveying the condensed liquor into the beak, by which it runs out.

'As in almost all distillations, expansive vapours are produced, which might burst the vessels, we are under the necessity of having a small hole in the balloon or recipient through which these may find vent; hence in this way of distilling, all the products which are permanently aëriform are entirely lost, and even such as difficultly lose that state have not sufficient space to condense in the balloon; this apparatus is not, therefore, proper for experiments of investigation, and can only be admitted in the ordinary operations of the laboratory or in pharmacy.' Lavoisier, *Elements of Chemistry*, *Kerr's Translation*, p. 462, 1793.

Apparatus for Fractional Distillation.

The body provided with a tubulure at the side and a head is followed by three double-necked and quilled receivers fitted one to another in a horizontal series. The distillate is received in the three flasks placed under the receivers. Receivers of this type were described by Peter Woulfe in the *Philosophical Transactions* for 1767 for condensing the vapours of nitric acid.

Apparatus for Fractional Distillation, known as the 'Hydra'.

Similar to the last, but the recipients are arranged vertically.

Compound Distillatory Apparatus of Hassenfratz.

'This apparatus "is calculated for the most complicated distillations, and may be simplified or extended according to circumstances." It consists of a tubulated glass retort, a tubulated balloon or recipient, and two or three bottles with three necks; the farthest neck of the last bottle is connected with a jar in a pneumato-chemical apparatus. "The juncture between the retort and the recipient must be luted with fat lute, covered over with slips of linen, spread with lime and white of egg; all the other junctures are to be secured by a lute made of wax and rosin melted together."' Lavoisier, *Elements of Chemistry*, *Kerr's Translation*, p. 468, 1793.

The glass tubes in the middle necks of the bottles were suggested to Lavoisier by Mr. Hassenfratz as a means of avoiding the disaster occasioned by the water in the cistern of the pneumato-chemical apparatus rushing back into the last bottle whenever a small diminution in the heat of the furnace occurs.

Apparatus for the Preparation and Examination of Gases.

Dr. Priestley's Apparatus for collecting the elastic fluids which are evolved when metals dissolve in acids with effervescence.

The chief inconvenience of this apparatus is that in many cases effervescence begins before we have time to cork the bottle properly, and some gas escapes, by which we are prevented from ascertaining the quantity disengaged with rigorous exactness.

Lavoisier's Apparatus for Metallic Dissolutions.

'To remedy this, Lavoisier at first used a bottle with two necks into one of which the glass funnel is luted so as to prevent any air escaping; a glass rod is fitted with emery to the funnel, so as to serve the purpose of a stopper. Pl. vii. fig. 3.' Lavoisier, *Elements of Chemistry, Kerr's Translation*, p. 476, 1793.

Apparatus for Class Experiments with Gases.

Detonating Bottle of very stout glass.

Three Glass Cylinders of stout glass, with funnel mouths.

Graduated Gas Tubes.

Eudiometers.

'The glass of which some of these early forms of detonating tubes is made is extremely thick to enable them to withstand the explosion; but "the difficulty of preparing and annealing the instrument is such that it is rare to find one that remains sound for any length of time. It sometimes happens that after an instrument has been made for months, it suddenly explodes without being touched."' Griffin, *Chemical Handicraft*, No. 2342.

Apparatus used for Analysis.

Test glasses. Conical shape, thick glass. Broader at base than at mouth.

Test glasses. Conical shape without stem.
Griffin, *Chemical Handicraft*, Shape No. 2412.

Test glasses. Clark's conical pattern with stem.
Griffin, *Chemical Handicraft*, Shape No. 2410.

Marsh's Arsenic Test Apparatus.

A tube with two bulbs is fitted with a brass stopcock and jet and is supported upon a mahogany stand.

Sir H. Davy's Apparatus for estimating the quantity of calcium carbonate in soils. 1814.

A. Bottle for receiving the soil.
B. Bottle containing muriatic acid, furnished with a stopcock.
C. Tube connected with a flaccid bladder.
D. Bottle for containing the bladder—filled with water.
E. Graduated measure.

When the stopcock is turned, the acid flows into A, and acts upon the soil; the elastic fluid generated passes through C into the bladder, and displaces a quantity of water in D equal to it in bulk, and this water flows through the tube into the graduated measure: and gives by its volume the indication of the proportion of carbonic acid disengaged from the soil; for every ounce measure of which two grains of carbonate of lime may be estimated. *Elements of Agricultural Chemistry*, 1814, p. 167, fig. 15.

Thermometer.

Original Six's Thermometer. 1794.

J. Six, *Construction and Use of a Thermometer*. 4 pls., 8vo. Maidstone, 1794.

Other Collections.

The Collection of **Minerals** has been registered, labelled, and arranged in 4 cabinets of 24 drawers each. It consists of 1,169 specimens.

A large collection of the 'tops' of Alpine peaks was presented by the Rev. W. A. B. Coolidge, Fellow of the College, and is greatly treasured as the memorial of a work unique among the achievements of Fellows of Oxford Colleges.

Mr. Günther has also housed a part of his own private Collections in the Laboratory Building. And a relief map of the Volcanoes of the Phlegraean Fields was completed under his direction in 1906 (College Order, Dec. 13, 1905). This model was used in illustration of Lectures at the Royal Institution.

Two Rock-specimens collected by Charles Darwin in S. America during the Voyage of the *Beagle* were exhibited in the Examination Schools on the occasion of the Darwin Centenary Celebration in Oxford in 1909.

APPENDIX D

Additions to Bibliography of Dr. Daubeny.

(See p. 53 of *History*.)

1837. Botanic Garden. An unsigned article in Ingram's *Memorials of Oxford.*

1849. Nov. 19. Testimonial to E. H. Hansell, candidate for Headmastership of Rugby.

1850. Oxford Botanic Garden, a popular Guide to the Botanic Garden, &c. 8vo.

1853. Ditto, 2nd edit. 1*s*.

1856 & 1864. Supplements to ditto.

1867. *Obituary notices* in *Gardener's Chronicle*, 21 Dec.; *Medical Times and Gazette*, 21 Dec.; *Eyes and no Eyes*, by W. Tuckwell, Taunton, 1 Jan. 1868, repr. in *Oxford Chronicle*, 25 Jan. 1868.

APPENDIX E

Register of Names of Persons who have attended the Chemical Lectures of Dr. Daubeny.

These names, additional to those printed in the History of the Laboratory, pp. 91–102, *have been found in a Register of Attendance, now accessible by the courtesy of the Keeper of the University Archives.*

1853. Lent. **Coulthurst, Nicholas.** Magd. H. Matric. 1851. Settled in Quebec.

James, Charles Deere. Exeter. B.A. 1854.

Rowe, Samuel Nicholas. Worcester. B.A. 1854.

Brook, James. Worcester. Vicar of Southborough, 1871.

Chaplin, Edward Morland. Magd. Hall. Rector of Chilton, Berks., 1857.

Dudding, Henry Swan. Magd. Hall. Rector of Stanton All Saints, Suffolk.

Newnham, Philip Hankinson. Wadham. IV Lit. Hum. '53. Vicar of Maker, Cornwall, 1875. F.R.Met.S. †1888.

Hewett, William Henry. Magd. Hall. Minor Canon, Carlisle, 1861–3; Vicar of Scarle, Notts. 1871.

Morgan, Arthur Middlemore. Exeter. Rector of Huish, N. Devon, 1872–84; Vicar of Mucking, Essex, 1884.

Wilson, Sir Charles Rivers. Balliol. Comptroller General of National Debt Office 1874; Finance Minister, Egypt, 1879. K.C.M.G. 1880.

Robinson, Francis Edward. Exeter. Vicar of Drayton, 1878.

Wickham, William. New Inn Hall. Bar.-at-law, I.T. 1857. High Sheriff of Hants, 1888. Edited 'Correspondence of the Right Hon. William Wickham', 1870.

1853. Mich. **Law, Alexander Patrick.** Corpus. M.A. from New Inn Hall, 1860.

Whigham, David Dundas. Oriel. M.A. 1857.

1854. Hilary. **Hasler, William Wyndham.** Ch. Ch. J.P. of Aldingbourne, Sussex.

1855. Lent. **Hart, Thomas Aubrey.** Magd. Hall. M.A. 1861.

Thomson, John. Exeter. Of Woodperry House, Oxon. J.P.

Hughes, Hugh Robert. Exeter. Bar.-at-law, 1859. Major 3rd Batt. R. Welsh Fusiliers, 1872–83.

Alexander, William Henry. Pembroke. Bar.-at-law, I.T. 1860.

Trevilian, Edwin Brooke (Cely). Balliol. Bar.-at-law, I.T. 1863. Of Midelney Place, Somerset. J.P.

Hill, Joseph. Worcester. Rector of Monnington, co. Hereford, 1864–74; of Wimblington, 1874.

LECTURE ON AGRICULTURAL CHEMISTRY.

Additional Names.

1855. Mich. **Smith, Algernon Emerick Clementi.** Worcester. Vicar of Coatham, Yorks. 1870–4; Rector of Chadwell St. Mary, 1879.

Barnwell, John Clement. Worcester. M.A. 1860.

Morgan, Samuel Christopher. Wadham. D.D. 1881. Vicar of Aldershot, 1864–9; of St. Mary's, Leamington. 1884.

Craig, Alain Tudor. Wadham. IV. Math. M.A. 1861. In Holy Orders.

Aldworth, John. Worcester. P.C. of Haigh, co. Lancs., 1863–†1870.

Phipps, Pownall William. Pembroke. Rector of Upton Slough, 1873–86; of Chalfont St. Giles, 1886.

Woodbridge, Henry William. Pembroke. Bar.-at-law, Lincoln's Inn, 1860.

1856. Hilary. **Johnston, John Lindsay.** Corpus. Bar.-at-law, Linc. Inn 1861.

Rhoades, Edward James. Pembroke. Vicar of Elmley Castle, co. Worc., 1878.

APPENDIX F

And lands that stretch with endless span
From east to west, from south to north,
Are often much more trouble than
They're worth. GODLEY.

LIST OF GEOGRAPHICAL WRITERS, MEMBERS OF MAGDALEN COLLEGE

Magdalen had been founded too late to contribute a scholar to that small band of Balliol men, who crossed the Alps into Italy soon after the middle of the fifteenth century. One of their principal objects was no doubt the study of medicine, perhaps under the celebrated Guarino Veronese of Ferrara. The best known of them, John Free of Bristol, wrote, when at Padua, a Cosmography, the MS. of which is now in the Balliol Library.

Edward Wotton, M.D., of Padua, must have been one of the first members of Magdalen whose scientific work was markedly influenced by foreign travel and by a sojourn at a foreign University.

Most of the geographical or topographical works of the undermentioned authors are in the College Library.

Cosmography: Peter Heylin

EUROPE:

BRITAIN:
- Camden
- Childrey
- Druce (*Oxfordshire*)
- Homer (*W. Highlands*)
- Jenkins (*Roman Sites*)
- Millard, J. E. (*Basingstoke*)
- Miller, H. (*Ashbury*)
- Ogilvie
- Schomberg (*Bagley*)
- Wade (*Exmoor*)

FRANCE:
- Best
- Daubeny (*Auvergne*)

NORWAY, SWEDEN, & LAPLAND:
- Brooke

SPAIN:
- Ashley
- Brooke
- Graves

SWITZERLAND, &c.:
- Coolidge

ITALY:
- Addison
- Best
- Daubeny
- Drake
- Graves
- Günther
- Symonds, J. A.

SICILY, MALTA:
- Abrahall
- Dryden

GREECE:
- Chandler
- Senior
- Symonds

TURKEY, ASIA MINOR, LEVANT, &c.
- Cartwright
- Chandler
- Graves
- Hogarth
- Myres
- Roe
- Senior
- Smith, T.

PERSIA:
- Cartwright (c. 1611)
- Günther (1898)

INDIA:
- Roe (1592)

BORNEO:
- Moulton

COCHIN CHINA:
- Ashley (translator)

CHINA:
- Clementi
- Johnston, R. F.

MOROCCO:
- Brooke
- Ogilvie

CENTRAL AFRICA:
- Neave

NORTH AMERICA:
- Daubeny
- Miers (*Klondyke*)
- Ogilvie

AUSTRALIA:
- Dutton
- Roth

ANTARCTIC:
- Madigan (*Mawson's Expedition*) (*Report in preparation*)

Greek in Responsions.

(See p. 167.)

In 1904 at the height of the Greek controversy at Oxford, several men of Science, whose opinions will still carry weight with most people, wrote to me privately on the subject. I am sure that they would not mind their opinions being reproduced now. In justice to, I believe a majority of, the scientific Professors of Oxford, it should be stated that their views were opposed to those of the four Presidents of the Royal Society quoted below. Without wishing to appraise the scientific merits of the two parties, these authorities are quoted because they confirm my own opinion, that Oxford and Cambridge men should be of a wider learning than the students from the new technological institutes, now called universities. To attain to the broader outlook, our graduates must study their subject from the historical and philosophical as well as from the practical standpoint.

Lord Avebury.

'I think a slight knowledge of Greek, so much for instance as to understand the derivations of words derived from that language, and to read, if only with the help of a dictionary, easy Greek authors is very desirable. I would not however attempt more in the case of Science degrees. It seems to me also most important that some knowledge of Science should be required in the case of classical degrees.'

Sir William Turner.

'As scientific nomenclature is largely based on Greek, a knowledge of the elements of that language is useful as assisting in the comprehension of the terms employed in scientific description.'

Lord Lister.

'In my opinion an elementary knowledge of Greek should be required of all candidates for Science degrees; but anything beyond that should be optional, not compulsory.'

Sir William Huggins.

'I consider Greek so important as a means of culture that I should regret to see it cease to be compulsory. It seems to me the case might be met by improved methods of teaching Latin and Greek, and by the examination in Greek being less severe in the case of science men.'

rd Kelvin.

' I believe the knowledge of Greek required for the "Little-go" at Cambridge, though small, is exceedingly useful to science students in after life. I think the Universities of Oxford and Cambridge should continue to require a moderate practical knowledge of Greek of all their graduates; while arranging that for science students it should not damagingly interfere with their other studies.'

Sir Archibald Geikie.

'I would greatly regret to see Greek eliminated from the education of scientific undergraduates.'

Lastly I will quote from a letter from a member of Trinity College, a thoroughly practical man of affairs, who had taken a Poll-degree at Cambridge. His view will appeal to many.

'We owe more than we think to Greek, and it is only a fool's argument to say we have forgotten the little we know. I never knew very much, and have forgotten most of that; but my Euclid and Algebra are in the same case. I am sure I could not write out Euclid i. 48 for instance with reasonable correctness, nor could I do a quadratic equation. If the "ergo" of this is "abolish them", where are you going to stop?' (*Eustace Neville Rolfe.*)

IN MEMORIAM:

CHARLES HERBERT GEORGE MARTIN, M.A., F.Z.S.

War is no respecter either of personality or promise. By the untimely death of Lieutenant Charles Herbert George Martin, of the 3rd Monmouth Regiment (T. F.), reported on May 4, at the age of 34, science loses one of the most loyal and painstaking of her younger workers, one whose work augured a distinguished career. Like so many who have fallen in this war, he was an only son. His father was a man of mark, Mr. Edward Pritchard Martin, for some time manager of the Dowlais Iron Works and later a leading ironmaster of South Wales. His mother, the daughter of Mr. Charles Herbert James, for some years M.P. for Merthyr Tydfil, was first cousin of the President of Magdalen, and when "Charlie" Martin left Eton in 1900, it was natural that he should come to that College. As a boy he had shown himself a keen field-naturalist and, being fortunately able to choose his career, he decided to pursue Zoology and studied under Mr. R. T. Günther, his tutor at Magdalen, and Professors Weldon and Bourne.

Of an original and very independent turn of mind, he followed his own line rather than that of the Zoology School, in which, however, he took a Second in 1904. But he was the real student who develops after, rather than before his degree. None who knew him in Oxford will ever forget his unconventional, apparently irresponsible but lovable personality, his enthusiasm for the things that mattered and his tenacious grip of his own point of view. When the College Beagles were started, it was Martin who not only superintended the construction of kennels, but also, taking a shovel, mixed and turned over the heavy concrete for the floor. Yet in some things the practical details of life were irksome to him. He could not be tied by Greenwich time, and consequently he was not always successful in catching a train or in keeping an engagement, scientific or social.

After the Schools he became interested in a variety of subjects, but owing to a diffidence in his own powers and to a dislike of writing some years elapsed before his first serious contribution to knowledge was completed and published. This was on the Thread-cells of the Turbellaria, a line of research in which his great friend G. H. Grosvenor, of

New College, had also been engaged before his premature death. In 1905 Martin stayed up to work at Oxford, and in the summer co-operated in the Survey of the Freshwater Lochs of Scotland under Sir John Murray, who thought well of his powers. In 1906 he was awarded the Biological Scholarship at the Zoological Station at Naples, where he became a *persona grata.* The late Dr. Anton Dohrn remarked to the present writer, "So many of our visitors come once and no more, but Martin is one of ourselves."

During the ten peaceful years that have passed since Martin took his degree (and how short a time it seems!) he had acquired a wide reputation among specialists for the soundness of his work in the most difficult of all biological investigations, the study of the structure and life-history of those low and minute forms of animal life whose vital processes are almost beyond the limits of microscopic vision. Commencing with work on the Acinetaria in 1909, he passed on to the yet smaller Trypanosomas, Trypanoplasmas, and to other pathogenic protozoa, swarms of which infest the bodies of other animals to the great detriment of their hosts, and are in the forefront of the battle between Science and Disease. Later he discovered and attacked the remarkable Flagellate Protozoa that lurk in "Sick Soils," a matter of very great importance to agriculturists and horticulturists. He threw new light on their life by his papers in the *Proceedings of the Royal Society* for 1912, and again, in co-operation with Lewin, in the *Philosophical Transactions* for last year. Further details on the same subject were published by him in the German journal, the *Zoologischer Anzeiger*, and his most recent communication, on Thread-cells, also appeared in another scientific journal of that misguided nation, shortly before the outbreak of the War.

In 1909 Martin was acting as Assistant to the Professor of Zoology at Glasgow, but in the following year all thoughts of teaching were supplanted by the responsibilities that devolved upon him when, in consequence of his father's sudden death, he came into a considerable property and a country-place in Monmouthshire—The Hill, Abergavenny. There he threw himself into the duties of a country life and entered into its pleasures. His friends hoped that he might eventually find, either at Reading or at Oxford, a half-way house between the Lister Institute in London and his Welsh home, and that he would combine the researches of a Laboratory Naturalist with the Mastership of the Crickhowell Harriers.

Two at least of the German officials of the Stazione Zoologica of Naples, Reinhard Dohrn, the present Director, and Gast, enjoyed their first experiences of an English

country house under his hospitable roof. The first-named was on a visit to this country in the year of the Darwin Centenary gathering at Cambridge.

For Martin bade fair to be in his generation one of that type to which English science owes so much, the gentleman of independent means who pursues it for its own sake and at the dictates of natural predilection and passion—the type of Boyle and Cavendish, of Darwin and Romanes, Lubbock and Lilford. None of those who were privileged to know him at Oxford will forget him: his name will be remembered and honoured by specialists in more than one branch of science.

As to his soldiering, his was no sudden or late response. He had joined the O.T.C. at Glasgow University and worked hard with it. He was in command of the Machine-Gun Section when he was killed by shrapnel. "Always cheerful, his face ever one broad smile"; so a brother officer described him.

He married, in 1912, Beatrice Elise, daughter of Ferdinand Hanbury, Esq., and leaves, as his friends are glad to think, an infant son.

[H. W. and R. G. in the *Oxford Magazine*, May 14, 1915.]

Biological science has to deplore the death of Mr. C. Martin, who was killed recently in the fighting near Ypres. Mr. Martin was one of the most promising of the younger English men of science, and his work already published showed that he was an investigator of a very high order. . . . On his return to England he took a post for a time in the zoological laboratory of the University of Glasgow, but relinquished it in order to work in a private laboratory which he had installed at his home, The Hill, Abergavenny. His previous studies of the life-history and structure of the protozoa had prepared him for playing a leading part in the important investigations into the soil-protozoa, which investigations had assumed a great importance owing to the work of Russell and his colleagues at Rothamsted. Into this work Martin threw himself with an ardour which his casualness of manner could not conceal. He designed ingenious methods for the isolation and collection of soil organisms, and would, had he lived, have accomplished great work in soil protozoology. For Martin had a sound, penetrating, and critical mind, and, though erratic and exasperatingly elusive in his ordinary life, was patience personified when he exchanged the hunting saddle, which he loved, for the seat in his laboratory, which he loved no less.

His friends were often baffled by his unusual attitude to life, which was that of a great healthy youth full of the spirit of adventure and refusing to be trammelled by conventions and accepted standards. There was nothing commonplace in him, and the mask of carelessness which he was amused to wear concealed a noble seriousness of purpose and was but an aspect of that complex quality of genius which he undoubtedly possessed. Martin's most recent work was done in part at Abergavenny and in part at Rothamsted. In the latter place Dr. Russell, though for the ordering of his laboratory he may at times have wished for a more ordinary type of researcher, was fully alive to Martin's conspicuous merits, and recognized his great and growing abilities. In truth Martin was always a boy, lighthearted and jolly and lovable, and he brought into the somewhat tired air of laboratories a breath of the open. He had the spirit of the pioneer with the mind of the savant. Research was a great quest to which he had devoted his life. But other adventures claimed him. Always actively interested in military affairs, he joined the Artillery at the outbreak of war, and now he has fallen. In the hearts of his friends his death leaves a great void which must always remain. They will continue their plodding course without the hope that on this day or that, when least expected, that tall figure would come bursting into the laboratory, and after a bout of friendly chaff settle down to discuss some big problem of biology, intent on pursuing truth and advancing knowledge.

[F. Keeble, in the *Gardeners' Chronicle*, May 15, 1915.]

An Appreciation.

The first of our citizen officers to fall. Poor Charlie! The most peace-loving soul that ever breathed—cheery and kind always, but away behind a will of iron. Whatever road he thought was right, that road he went; and so when duty and his country called he had to go. Straight as a die, a real gentleman, and a sportsman; willing to take on anybody at anything; never acknowledging defeat, always a cheery laugh and some quaint half-humorous remark to show that next time luck would change. Thus, I am sure, he died—game to the last. Facing the foe unbeaten; a gallant gentleman loved alike by officers and men; a loss to science; a loss to his regiment; a loss to his town and his friends. They know well what they have lost. God rest his soul.

[One who knew him, in the *Abergavenny Chronicle*, Friday, May 14, 1915.]

[Another notice appeared in *Nature*, May 13, 1915.]

Note on Work at Glasgow.

Charles Martin was appointed Demonstrator of Zoology in the University of Glasgow at the beginning of the Winter Term, 1907, and remained with us until, in 1911, his private affairs required him to take up residence in the south. During this period he took his full share in the strenuous work of teaching the large medical classes in elementary Zoology, but this by no means exhausted his energies, and each evening after the last batch of students had been got rid of, shortly after five o'clock, he would take off his coat and settle down to a long evening's work at research. During these four years he produced a series of admirable papers, some nine in all, most of which were published in the *Quarterly Journal of Microscopical Science.*

Martin's work was characterized by faultless technique, by skill in observation, and by unwearying pertinacity in worrying out the problem before him. But what impressed one most was his very remarkable intellectual power and "grip," combined with the gay light-heartedness of the best type of investigator, who does not take himself and his problems too seriously, but looks rather on his efforts to wrest her secrets from nature as a great game. Martin was much loved and admired by his colleagues, and his loss has thrown a gloom over the laboratory which it will take long to get rid of.

In addition to his laboratory work he held a commission in the O. T. C. and was one of its most popular officers.

[Professor Graham Kerr.]

APPENDIX G

Whose praise do they mention?
  Of what is it told?—
What will be for ever;
  What was from of old.

LIST OF TREATISES ON SCIENTIFIC SUBJECTS BY MEMBERS OF MAGDALEN COLLEGE

1458–1850.

Before the Erection of the Daubeny Laboratory.

1552. **Wotton, Edward.**

De differentiis animalium. fol. Paris, 1552.

A part edited by Tho. Moufet appeared in 1634 under the title Insectorum sive minimum animalium theatrum.

Wotton was the first Fellow of the College of Physicians to bring Zoology into the list of subjects on which a physician should be informed. (Norman Moore, *Hist. of Medicine.*)

1559. **Peter Morwent.**

The Treasure of Evonymus, conteyninge the wonderfull hid secretes of nature, touchinge the most apte formes to prepare and destyl medicines for the conservation of health. Trans. from the Latin of Conrad Gesner.

4°, London. Rep. 1565 and 1575.

1639. **Chilmead, Edmund.**

Translated Hues and Pontanus' 'A learned treatise of the globes, both coelestial and terrestrial, with their several uses'.

8°, London, 1639.

1654–8. **Trapham, Thomas.** M.D. Caen.

A Discourse of the State of Health in the Island of Jamaica. 8°, London, 1679. Noticed in *Phil. Trans.* No. 141, p. 1030.

1660. **Capell, Daniel.**

Tentamen medicum de Variolis, circ. 1660.

1661. **Childrey, J.**

Britannia Baconica. Or, the Natural Rarities of England, Scotland and Wales. According as they are to be found in every Shire. Historically related, according to the Precepts of the Lord Bacon; methodically digested; and the Causes of many of them Philosophically attempted. With Observations upon them, and Deductions from them, whereby divers Secrets in Nature are discovered, and some things hitherto reckoned Prodigies, are fain to confess the cause whence they proceed. *Usefull for all ingenious men of what Profession or Quality soever.* London, 1661.

'On the descent of *Hedddenton* hill near *Oxford* rises a spring, which runs down towards Kingsmill, a mill so called, lying over against *Magdalen* Colledge. It is reported, that this spring hath a petrifying quality, and will in some short time, if a stick be laid in it, either turn it into stone, or wrap it in a stony crust.'

1672. **Drope, Francis.**

A short and sure Guide in the practice of raising and ordering Fruit-trees. 8°, Oxford, 1672.

1672. **Sherley, Thomas.** M.D. Magd. Coll. School, 1645.

A philosophical essay declaring the probable causes whence stones are produced in the greater world. 8°, London, 1672.

Cochlearia curiosa; or the curiosities of scurvy-grass. 8°, London, 1676.

[c. 1729. **James Fynes.**

'The Method of finding a meridian line by shadows improved to a greater success'. Bradley MSS. vol. 47.]

1748. **Knight, Gowin.** Librarian of the British Museum. A 'famous maker of strong Magnets', by a secret process, for the Admiralty. He was awarded the Copley Medal in 1747 for curious experiments with natural and artificial magnets, and in the following year published

'An attempt to demonstrate that all the Phenomena in Nature may be explained by two simple active principles, Attraction and Repulsion: wherein the attractions of cohesion, gravity and magnetism, are shown to be one and the same, and the phenomena of the latter are more particularly explained.' 4°, London, 1748, and 2nd edit. 8°, 1764.

His Battery of Magnets was presented to the Royal Society by Dr. John Fothergill in 1776, and was rearranged by Capt. Beaufort in 1828.

1751. **George Horne.** President, 1768.

The theology and philosophy in Cicero's *Somnium Scipionis* explained; or a brief attempt to demonstrate that the Newtonian system is perfectly agreeable to the notions of the wisest ancients, and that mathematical principles are the only sure ones. 8°, London, 1751.

A fair, candid and impartial state of the case between Sir Isaac Newton and Mr. Hutchinson. In which is shown how far a system of physics is capable of mathematical demonstration; how far Sir Isaac's, as such a system, has that demonstration; and consequently, what regard Mr. Hutchinson's claim may deserve to have paid to it. 8°, Oxford, 1753.

De Morgan has reviewed these youthful effusions of the future President and Bishop. *Budget of Paradoxes*, pp. 90–3.

1771. **Lysons, Daniel.** M.D. Com. 1744.

An Essay upon the effects of camphire and calomel in continual fevers, illustrated by several cases. 8°, London, 1771.

Practical Essays upon intermitting Fevers, Dropsies, Diseases of the Liver, the Epilepsy, &c., and the operation of calomel. 8°, Bath, 1772.

1796. **Gibbes, George Smith.** M.D. Fellow, 1793.

A few observations on the component parts of animal matters; and on their conversion into a substance resembling spermaceti. 8°, Bath, 1796.

1828. **Chambers, James Petersham.** Editor of—

Treatise of the form of animals, by H. Cline; Directions for the management of the horses' feet in the stable, &c. Norwich, 1828.

1833. **Walker, Richard.** B.D.; Demy, 1812. Schoolmaster.

The Flora of Oxfordshire and its contiguous counties. Oxf. 1833.

1840–61. **Parsons, Rt. Hon. William.**

Account of an apparatus for grinding and polishing the specula of Reflecting Telescopes. *Edinb. J. Sci.* ix, 1828.

Account of a series of experiments on the construction of large Reflecting Telescopes. *Edinb. J. Sci.* ii, 1830.

An account of experiments on the Reflecting Telescope. *Phil. Trans.* 1840.

On the construction of large Reflecting Telescopes. *Rep. Brit. Ass.* 1844.

The monster telescopes, erected by the Earl of Rosse, Parsonstown; with an account of the manufacture of the specula; and full descriptions of all the machinery connected with these instruments. 8°, Parsonstown, 1844.

Observations on some of the Nebulae. *Phil. Trans.* 1844.

Appearance of the Moon, as seen by the aid of Lord Rosse's great telescope. On cardboard 4°, London, 1846?

Notice of the Nebulae lately observed in the Six-feet Reflector. *Rep. Brit. Ass.* 1849.

Observations on the Nebulae. *Phil. Trans.* 1850.

Notes on experiments relative to Lunar Photography, and the construction of reflecting specula. *Month. Not. Astr. Soc.* xiv, 1853–4.

Further observations upon the Nebulae, with practical details relating to the construction of large telescopes. *P. R. S.* xi, 1860–2.

On the construction of Specula of six-feet aperture, and a selection from the observations of Nebulae made with them. *Phil. Trans.* 1861.

1848. **Hessey, Robt. Faulkner.** Semicom. 1844.

Tubus astronomicus: carmen Latinum. 8°, Oxon. 1848.

1848. **Allen, Thomas.** Chorister, 1809; M.R.C.S.

Plain directions for the prevention and treatment of cholera. 3rd edit. Oxon. 1848.

1839–49. **Corfe, George.** M.D.; Chor. 1818.

A popular treatise on the kidney; its hitherto unknown functions and its diseases, in connection with the circulating animal oils, &c. 8°, London, 1839.

Mesmerism; a reply to Dr. Ashburner's remarks on phrenology, mesmerism, and clairvoyance. 8°, London, 1848.

The physiognomy of disease. 4°, London, 1849.

1850–1867.

Scientific and other Writings by Members of Magdalen College, from the Erection of the Daubeny Laboratory, 1848, to the Death of Dr. Daubeny in 1867.

With additions to the Register printed as Appendix E to the History of the Daubeny Laboratory.

1858. **Ley, William Clement.**

Laws of the Wind. 1872.
Modern Meteorology. 1879.
Aids to the Study and Forecast of Weather. 1880.
Cloudland. A study in the Structure and Character of Clouds. 8°, London, 1894.

Mackenzie, William Dalziel.

On Agricultural Depression.

1860. **Barber, Edward.** F.S.A.

Papers in the *Chester Archaeological Journal.*

1861. **Michell, E. B.**

Siege Life in Paris, by one of the Besieged.

Corfield, W. H. M.D.; F.G.S.; F.C.S.; F.I.C. Memb. d'honneur and Medallist R. Soc. Pub. Health of Belgium; Hon. Corr. Memb. R. Acad. Med. Belg.; Imp. Soc. Med. Constantinople and R. Soc. Hygiene, Italy; Hon. Memb. Soc. Franç. d'Hygiène and Hungar. Soc. Pub. Health; Fell. Med. Soc. Sweden; Prof. of Hygiene and Public Health, Univ. Coll. London; Cons. Sanit. Adviser H.M. Office of Works; Pres. Epidem. Soc. London; late Med. Fellow, Pembroke

Coll. Oxf.; Medical Officer of Health, St. George's, Hanover Square. † 1903.

A Résumé of the History of Hygiene. 1870.
Reports of British Association Sewage Committee. 1870–6.
Alleged spontaneous production of the poison of Enteric Fever. *Trans. Epidem. Soc.* 1874.
Health. 1880.
Dwelling-houses; their sanitary conditions and arrangements. 2nd edit. London, 1885. 4th edit. 1898.
A Digest of Facts relating to the Treatment and Utilisation of Sewage. 3rd edit. 1887.
Sore throat caused by slight escapes of Coal Gas. *Trans. Soc. Med. Offs. Health*, 1887.
A Treatise on Hygiene and Public Health. 1892.
Laws of Health. 9th edit. 1896.
Disease and Defective House Sanitation. 1896.
The Etiology of Typhoid Fever and its Prevention. 1902.

Tetley, J. G.

Old Times and New. 1904.
Forty Years and After. 1910.

1862. **Daman, Henry.** (Known as 'Hoppy' at Eton.) † Chelsea, May 11, 1915, aged 72.

1864. **Reid, R. T.** Created 1st **Baron Loreburn.**

Vivisection Bill, April 4, 1883.
Editor of Tomlinson's The Judicature Acts. London, 1883.
Leasehold enfranchisement [with H. Broadhurst]. 1885.
Bonds of Empire. The Liberal view, p. 147. 1904.
The maintenance of the Empire. 1905.
Commerce and property in naval warfare. 1906.
Capture at sea. 1913.

1865. **Gamble, J. S.**

On the State Forests and Forest Schools of France. Awarded Gold Medal of Highl. Agr. Soc. Scotland. *Trans. H. Agr. Soc. Scotland*, Edinburgh, 1872.
List of Trees, Shrubs, and Large Climbers of the Darjeeling District, Bengal. Ed. 1, 1878. Ed. 2, 1896. Calcutta.
A Manual of Indian Timbers. Ed. 1, Calcutta, 1881. Ed. 2, London, 1902.
The Bambuseae of British India. *Ann. of the Royal Botanic Garden, Calcutta*, vol. vii. 1896.
Many papers on Forestry and Botany Subjects in the Volumes of the *Indian Forester*, which he edited for various periods between 1872 and 1899.

The Forestry Exhibition at Paris and some of its lessons.
Trans. of Royal Scottish Arboricultural Soc., vol. xvi. 1901.
The Forests of India and their Management.
Journal of the Royal Colonial Institute, vol. xxxiv. London, 1903.
The Bamboos of the Philippine Islands.
Philippine Journal of Science, vol. v—additions in vols. vi, viii. Manila, 1910, &c.
New Lauraceae from the Malayan region. *Kew Bulletin*, 1910.
Arundinarias of the hills of Sikkim. *Kew Bulletin*, 1912.
Lauraceae of W. China collected by E. H. Wilson. *Plantae Wilsonianae*, Part iv. Cambridge, U.S.A., Univ. Press, 1914.
Materials for a Flora of the Malay Peninsula. Vol. iv, Gametopetalae (edited and mostly written by Sir G. King, K.C.I.E., F.R.S.). Vol. v, Monochlamydeae (nearly completed).
The Flora of Madras. [With S. T. Dunn.] In preparation.

Haggard, Sir W. H. D. K.C.M.G. Envoy Extraordinary and Minister Plenipotentiary to Buenos Ayres, 1902–6; Brazil, 1910.

Scott, S. G. Hon. Canon of Winchester. Father of S. G. Scott, p. 236.
History of St. Faith's, Winchester.

1867. **Massingberd, W. O.**
History of Ormsby. 1896.
Ingoldmells Court Rolls. 1902.

Edmundson, G. F.R.Hist.Soc.
Milton and Vondel: a curiosity of literature. 1885.
Numerous Articles in *English Historical Review*, v–xix. 1890–1904.
The Revolt of the Netherlands. William the Silent. The Dutch Republic. *Cambridge Modern History*, iii, 1904.
Archbishop Laud and his work. Lausanne [1905].
Frederick Henry, Prince of Orange. *Camb. Mod. Hist.* iv, 1906.
Brazil and Portugal. The Low Countries. *C.M. Hist.* x, 1907.
Holland and Belgium, 1839–70. *Camb. Mod. Hist.* xi, 1909.
Anglo-Dutch rivalry during the first half of the XVIIth Century. *Ford Lect.* for 1910. Oxford, 1911.
The Church in Rome in the first Century. *Bampton Lect.* 1913. London, 1913

1867. **Sherwood, W. E.** Mayor of Oxford, 1914–15.
Oxford Rowing. 8°, Oxford, 1900.

Dr. Daubeny. Died in December, 1867.
Bibliography, see Appendix D, *Hist. Daub. Lab.* 1904.

Yet, if little stays with man,
Ah, retain we all we can!
If the clear impression dies,
Ah, the dim remembrance prize! M. ARNOLD.

1869–1894.

SCIENTIFIC AND OTHER WRITINGS BY MEMBERS OF MAGDALEN COLLEGE WHO WORKED IN THE COLLEGE LABORATORY AFTER MR. EDWARD CHAPMAN'S APPOINTMENT AS LECTURER IN NATURAL SCIENCE IN 1869 TO THE DATE OF HIS RESIGNATION IN 1894.

1869. **Yule, C. J. F.** Died Feb. 10, 1905, buried at Shipton-on-Cherwell, Feb. 13.

On the Mechanism of opening and closing the Eustachian Tube. *Studies, Camb. Physiol. Lab.* i, pp. 58–63, 1873; *Proc. Camb. Phil. Soc.* ii, pp. 321–2, 1873.

On the action of Urari on the central nervous system. *Nature*, xii, pp. 320–1, 1875.

On the physiology of the dehiscence of the fruit of Momordica elaterium. *J. Anat. Physiol.* xi, pp. 348–52, 1877.

1872. **Ridley, S. O.**

On two cases of incorporation by sponges of Spicules foreign to them. *J. Linn. Soc.* 1881.

Polyzoa; Coelenterata; Spongida. [Collected by H.M.S. Alert.] *P. Z. S.* pp. 44–61, 101–40, 1881.

On the genus Plocamia, and on some other sponges of the order Echinonemata. With Description of new species of Dirrhopalum. *J. L. S.* 1881.

Polyzoa, Coelenterata, and sponges of Franz-Joseph Land. *Ann. Mag. Nat. Hist.* vii, pp. 442–57, 1881.

Madreporaria. [Coll. by T. Conry at Ascension.] *A. M. N. H.* viii, 1881.

On the arrangement of the Coralliidae, with descriptions of new or rare species. *P. Z. S.* 1882.

Contributions to the knowledge of the Alcyonaria, with descriptions of new species from the Indian Ocean and Bay of Bengal; including descriptions of new species from Mauritius. *A. M. N. H.* ix, pp. 184–93; x, pp. 125–33, 1882.

On the geographical distribution of corals. *Proc. Geol. Assoc.* vii, 1883.

The coral-fauna of Ceylon, with descriptions of new species. *A. M. N. H.* ix, 1883.

Notes on zoophytes and sponges obtained by Mr. F. Day off the East Coast of Scotland. *J. Linn. Soc.* xvii, 1884.

Wade, C. F. Clerk of Assize of N. E. Circuit.

Exmoor Streams; Notes and Jottings with practical hints for Anglers. 8°, London, 1903.

1874. **Bell, F. J.** Sec. R. M. S. 1883; F.Z.S.

Note on the name 'Mediterranean' as applied to part of the Human Race; together with a proposal of a New Term in its place. *Journ. Anthrop. Instit.* 1876.

Notes on the Myology of the limbs of Moschus moschiferus. *P. Z. S.* 1876.

An Account of the recent researches into the History of the Bacteria, made by and under the direction of Professor Cohn. *Q. J. Micr. Sci.* 1876.

Further Researches into the History of the Bacteria. [A Review of Cohn and Koch, Beiträge zur Biologie der Pflanzen.] *Q. J. M. S.* 1877.

Translated Gegenbaur's Elements of Comparative Anatomy. London, 1878.

Translated Johannes Müller, On certain variations in the vocal organs of the Passeres, that have hitherto escaped notice. 1878.

Observations on the Characters of the Echinoidea. I. *P. Z. S.* 1879.

Note on the Number of Anal Plates in Echinocidaris. *P. Z. S.* 1879.

Observations on the Characters of the Echinoidea. II. On the Species of the genus Tripneustes, Agassiz. *P. Z. S.* 1879.

On Palaeolampas, a new Genus of Echinoidea. *P. Z. S.* 1880.

On the Names to be applied to certain Echinoidea. *P. Z. S.* 1880.

Note on an Abnormal (Quadriradiate) Specimen of Amblypneustes formosus. *J. Linn. Soc.* 1880.

Observations on the Characters of the Echinoidea. III. On some genera and species of Temnopleuridae. *P. Z. S.* 1880.

On the Pentastomum polyzonum of Harley; with a note on the Synonymy of the allied Species. *Ann. Mag. Nat. Hist.* 1880.

Echinodermata. [Collected during the Survey of H.M.S. *Alert*.] *P. Z. S.* 1881.

On the apparent Retention of a Sur-anal plate by a young Echinometra. *J. Linn. Soc.* 1881.

Description of a New Species of the Genus Mespilia. *P. Z. S.* 1881.

Observations on the Characters of the Echinoidea. IV. The Echinometridae; their affinities and systematic position. *P. Z. S.* 1881.

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A note on the Characters of the Genus Crossaster, with the description of a new species. *Ann. Mag. Nat. Hist.* 1881.

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Description of a new Species of the Genus Archaster from St. Helena. *A. M. N. H.* 1881.

Descriptions of new or rare Species of Asteroidea in the Collection of the British Museum. *P. Z. S.* 1882.

Note on the Species of the Linnean Genus Asterias which are ascribed to Retzius. *A. M. N. H.* 1882.

Note on the Spicules found in the Ambulachral Tubes of the Regular Echinoidea. *J. R. Micr. Soc.* 1882.

An attempt to apply a Method of Formulation to the species of the Comatulidae, with the description of a new species. *P. Z. S.* 1882.

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Note on a Crinoid from the Straits of Magellan. *P. Z. S.* 1882.

Report on the Echinodermata collected by Mr. Francis Day in H.M.S. Triton off the Eastern Coast of Scotland in July, 1882. *J. Linn. Soc.* 1882.

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Observations on the Generic and Specific Characters of the Laganidae. *Ann. Mag. Nat. Hist.* 1883.

On the Spicules of Cucumaria hyndmanni, C. calcigera, and two allied forms. *J. R. Micr. Soc.* 1883.

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On the generic position and relations of Echinanthus [Anomalanthus] tumidus. *P. Z. S.* 1884.
On the species of Pseudoboletia. *Ann. Mag. Nat. Hist.* 1884.
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Note on some Parasites of Fishes from Madras determined by Dr. Örley. *Ann. Mag. Nat. Hist.* 1884.
Studies in the Holothuroidea. III. On Amphicyclus, a new genus of Dendrochirotous Holothurians, and its bearing on the Classification of the Family. *P. Z. S.* 1884.
Ditto. IV. On the Structural Characters of the Cotton Spinner (Holothuria nigra) and especially of its Cuverian Organs. *P. Z. S.* 1884.
Ditto. V. Further notes on the Cotton Spinner. *P. Z. S.* 1884.
A second note on Pentastomum polyzonum. *Ann. Mag. Nat. Hist.* 1884
Description of a new species of Minyad (Minyas torpedo) from North-West Australia. *J. Linn. Soc.* 1885.
Notes on a collection of Echinodermata from Australia. *P. N. S. Wales Linn. Soc.* ix, 1885.
Recent advances in Zoology; with especial reference to the origin of the Vertebrata. *Zoologist* ix, 1885.
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Some of the ways in which animals breathe. *Zool.* x, 1886.
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The 'Grouse Disease'. *Zoologist*, 1888.

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On the generic name of Asterias sanguinolenta, O. F. Müller. *Ann. Mag. Nat. Hist.* 1890.

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Stray notes on the nomenclature, &c., of some British Starfishes. *Ann. Mag. Nat. Hist.* 1891.

Asterias rubens and the British species allied thereto. *Ann. Mag. Nat. Hist.* 1891.

Description of a new species of Tristomum from Histiophorus brevirostris. *Ann. Mag. Nat. Hist.* 1891.

A test case for the law of priority. ['Holothuria' and 'Actinia'.] *Ann. Mag. Nat. Hist.* 1891.

Some notes on British Ophiurids. *Ann. Mag. Nat. Hist.* 1891.

Contributions to our knowledge of the Antipatharian Corals. *Trans. Zool. Soc.* 1891.

Ad historiam Cucumariae. *Ann. Mag. Nat. Hist.* 1891.

Observations on the rare Starfish, Bathybiaster vexillifer. *P. Z. S.* 1891.

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A contribution to the classification of Ophiuroids with descriptions of some new and little-known Forms. *P. Z. S.* 1892.

Description of a new species of Antedon from Mauritius. *Ann. Mag. Nat. Hist.* 1892.

Catalogue of British Echinoderms in the British Museum. 202 pp. 16 pls. 8°, London, 1892.

On the Echinoderms collected by the ss. *Fingal* in 1890 and by the ss. *Harlequin* in 1891, off the west coast of Ireland. *Proc. Dubl. Soc.* vii, 1892.

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Singular swarms of Flies. *Nature*, 1893.

On a small collection of Crinoids from the Sahul Bank, N. Australia. *J. Linn. Soc.* 1893.

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On Odontaster and the allied or synonymous genera of Asteroid Echinoderms. *P. Z. S.* 1893.

Note on three species of River Crabs of the genus Thelphusa, from specimens collected in Eastern Africa by Dr. J. W. Gregory, H. H. Johnston, and F. J. Jackson. *P. Z. S.* 1894.

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On the variations observed in large masses of Turbinaria. *J. R. Micr. Soc.* 1895.

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viii. On the Cholesterol content of the Liver of Rabbits under various diets and during inanition. [With G. W. Ellis.] *P. R. S.* 1912.
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1888. **Bremridge, R. H.** Secretary and Registrar, British Pharmaceutical Society.

Paget, Sir Arthur. 2nd Bart. *m.* 1897 Lady Muriel Finch-Hatton. Specialist at Patent Law; Secretary to Patent Laws Committee, 1900; Sec. to Arbitration Court in Grimsby

Fishery Dispute, 1900; Sec. to Arbitration Court under Metropolis Water Act, 1902; Sec. to University College Transfer Commission, 1905.

Caldwell, W. H. M. Vicar of East Ilsley, Berks.

1889. **Günther, R. T.**

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1890. **Fennell, C. H.** Charing Cross Hosp., Paris, Vienna. Sen. Asst. Med. Off., Hellingly Asylum, Sussex.

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Buzzard, E. F. M.D. 1902; Hon. Sec. and Fellow, Royal Society of Medicine.

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Walker, John Allsop. *b.* 30 Nov. 1871. Shrewsbury. M.A. 1897. Blue for Association Football, 1891–4. *m.* 1900 Margaret B. Shaw. Analytical Chemist at Burton-on-Trent.

1892. **Hill, Ernest George.** *b.* 26 Feb. 1872. II Chem. 1895; D.Sc. Dublin, 1906. Professor of Natural Science and Dean of Faculty of Science, Muir Central College, Allahabad. *m.* 1896 Margaret Brend Conder.

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Simpson, Herbert Clayton. *b.* 26 Nov. 1872. Lecturer in Chemistry, Montreal; Fellow of Trinity College, Toronto; Professor in English, Toronto, 1906–.

Walden, Allan Frederick. *b.* 16 Sept. 1871. Bradford Grammar School. Ex.; I Chem. 1895. Lecturer under Oxford C.C. 1895; Lecturer at New College, 1898–1902; Fellow 1908.

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1893. **Ashby, Harold Francis.** Harrow. III Physiol. 1896. Hants Regiment, 1898; S. Africa, 1900.

Balfour-Browne, William Alexander Francis. *b.* 27 Dec. 1874. St. Paul's. II Bot. 1896. Hockey and Cycling; Barrister. F.R.S.E., F.Z.S. Assistant to Dr. Garstang for Fishery Research, Marine Biological Association, 1901–3. Director of Sutton Broad Biological Laboratory, 1903–7. Lecturer in Entomology, Cambridge University. Member of Caius College, 1914. *m.* 1902 Elizabeth Lochead, da. of W. H. Carslaw, D.D., having issue Violet Eliz. *b.* 1 Oct. 1903, Eileen F. *b.* 20 Jan. 1905, John W. A. F. *b.* 15 May, 1907.

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Jex-Blake, Arthur John. *b.* 31 July, 1873. Eton. D.; II Cl. Mod. 1894; I Chem. 1896; Radcliffe Travelling Fellow, 1902; B.Med. 1901; F.R.C.P.; Goulstonian Lecturer, R. Coll. Phys. 1913; Asst. Phys. St. George's Hosp.; Asst. Phys. Brompton Hosp. for Consumption.

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Odling-Smee, George Smee. *b.* 25 May, 1873. Oxford Military College. III Physics, 1896. *m.* i. 1902 Emma Mary Hahn, ii. 1912 Amelia, da. of Col. Casson. Mayor of Guildford 1913–16.

Page, Alfred Finch. *b.* 2 Sept. 1873. Bradford. ℭ.; I Chem. 1896. Formerly Master at Mill Hill School; H.M. Inspector of Schools, Board of Education, 1902–.

Shorter, Harry Vivian Spencer. ℭ.; II Chem. 1896; Asst. Master, Wheelwright Grammar School, Dewsbury; Sheffield Grammar School, 1903; King Edward VII School, Sheffield, 1905.

Stancomb, William. Son of William Stancomb (*Daubeny Register*, vol. 1, p. 114). II. Chem. 1896. Brewer at Guinness's Brewery, Dublin. † Jan. 1907.

Sherwood, Edward Charles. *b.* 5 Feb. 1873. Magdalen College School. ; II Math. Mods. 1894; II Math. 1896; II Chem. 1897. 'Varsity VIII, 1895; Science Master, Westminster School, 1901. F.C.S. Orders. Head Master, St. Lawrence College, Ramsgate, 1906.

Scott, Samuel Geoffrey. *b.* 11 March, 1875. Clifton. III Physiol. 1897; St. Thomas's Hosp.; B.Med. 1902. Demonstrator in Histology, Oxford; F.R.S.Med.

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Jones, George Arthur. III Physiol. 1897; L.S.A. 1902. St. George's. Anaesthetist Samarit. Free Hosp., Grosvenor Hosp. *m.* 1903 Marjory Wright.

Chapman, Edward Henry. *b.* 5 Feb. 1874. Eton, II Morph. 1897. Barrister-at-Law. *m.* 1910 Elsie, da. of F. Adair Roberts. Captain T.F. Reserve, 1915.

1894–1915.

Register of Names of Members of Magdalen College who have attended Courses of Scientific Instruction since 1894.

Extra tuition in honour chemistry has been given by

J. Watts, D.Sc. Lond.	1885–1899
D. R. Wilson, Magd.	1899–1903
N. V. Sidgwick, Linc.	1903–1907
T. S. Moore, Magd.	1907–1914

and in honour physiology by Dr. Ramsden of Pembroke and Dr. Vernon of Magdalen.

𝔇. = Demy; 𝔖. = Scholar; 𝔈𝔵. = Exhibitioner.

1894.

Armitage, Francis Paul. *b.* 21 April, 1875. R. Grammar School, Lancaster. 𝔈𝔵.; I Chem. 1898; F.C.S. Asst. Master at St. Paul's School.

A History of Chemistry. 266 pp. London, 1906.

Blaine, Gilbert. Matric. 1894. 2nd Lt. 3rd Batt. Somersets.

Hunt, Richard. *b.* 22 Aug. 1874. Charterhouse, matric. 1893. Farming near Colchester. *m.* 1897 Elizabeth C. Dove.

Ormrod, John Baxter. *b.* 19 May, 1875. Manchester Grammar School. 𝔇.; I Math. 1898; I.C.S. 1898. Collector and Assistant Commissioner of North-West Provinces and Oudh. 1899. *m.* 1905 Dora McCombish.

Tinne, Philip Frederic. *b.* 20 Dec. 1874. Eton. III Physiol. 1897; M.R.C.S., L.R.C.P. 1902; M.B. 1904. H. S. and H. P. St. George's Hospital.

1895.

Crossley, Sir Kenneth Irwin. 2nd Bart. *b.* 17 Feb. 1877. Eton. III Chem. 1898. Member of Engineering Firm of Crossley Bros., Manchester. Of Mobberley Hall, near Knutsford, Cheshire. *m.* 1901 Florence J. Field.

Grazebrook, George Ward William. *b.* 31 March, 1877. Eton. IV Chem. 1898. With Wolseley Motors Limited

(Vickers, Ltd.), Birmingham, 1914. *m.* 1902 Eleanor B. Charrington.

Hildesheim, Oscar. *b.* 20 Aug. 1876. Ex.; I Physiol. 1899; B.Med. 1902; M.D. 1905. Div. Police-Surgeon; late House Physician St. Thomas's.

Fat Metabolism of Liver. *J. Physiol.* 1904.
Epidemic Cerebro-Spinal Meningitis and posterior basic Meningitis. *Lancet*, 1905.
Hydrocephalus and posterior basic Meningitis. *Pract.* 1905.
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Sartoris, Arthur Hugh. *b.* 4 Oct. 1875. Eton. Matric. 1895. Of Weekley and Rushden Hall; J.P. for Northants.

Spilsbury, Bernard Henry. *b.* 16 May, 1877. II Physiol. 1899; M.B. 1905. Medical expert in Crippen and other criminal cases. Lecturer in Pathology and Curator Pathological Museum, St. Mary's Hosp.

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Wilson, Duncan Randolph. *b.* 27 Dec. 1875. Eton. D.; I Chem. 1898. Lecturer in Chemistry at Magdalen, 1899–1903; H.M. Inspector of Factories, 1904–. *m.* 1915 Freda, da. of James Lee.

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Cardwell, Hugh Brodie. *b.* 1877. Clifton, matric. 1895. *m.* Violet Lindsay-Hogg. Maj. 6th Sussex Batt. R.F.A.

Golla, Frederic Lucien. *b.* 11 Aug. 1877. D.; I Physiol. 1900; M.B. 1904; M.R.C.P. 1907. Asst. Physician St. George's; Lecturer on Pharmacology and Clin. Medicine, St. George's. Lt. R.A.M.C.

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Editor and Contributor to *Arch. Path. Inst.*, London Hospital, 1908.

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Kaye, Henry Wynyard. *b.* 21 May, 1875. Winchester. II Cl. Mods. 1896; M.B. 1903; M.R.C.S., L.R.C.P. 1903; M.D. 1908. Physician to Nicolson Mackenzie Memorial Hosp., Strathpeffer Spa (May to Nov.); Medical Officer, Villa Emily Home for Invalid Ladies, San Remo (Nov. to May). *m.* 1906 Amy Wigram.

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Maclachlan, Alexander Fraser Campbell. *b.* 23 July, 1875. Eton, matric. 1894. Lieut. King's Royal Rifles, 1901, D.S.O.; Capt. 1906; Adjt. 1907–10. Served in S. Africa (wounded and mentioned in dispatches).

Singer, Charles Joseph. *b.* 2 Nov. 1878. City of London, and University College, London. Ex.; II Zool. 1899; M.B. 1905; M.R.C.P. 1909; M.D. 1911; F.R.S.Med. Surgeon to Sir J. Harrington's Expedition to the Sobat River, 1903–4; Physician, Dreadnought Seamen's Hospital;

Registrar of Research Institute, Cancer Hospital, S.W. 1911; Mitglied der deutschen Gesellsch. für Geschichte der Medizin u. d. Naturwiss. *m.* 1910 Dorothea, da. of Nathaniel Cohen. Philip Walker Student in Pathology; Pathologist to Central Military Hosp., Chatham, 1914.

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Johnson, George Montague. *b.* 16 Feb. 1879. Charterhouse, IV Physiol. 1901; M.B. 1908.

Ryder, Charles Frederick. *b.* 24 Feb. 1879. Charterhouse. D.; II Zool. 1901. Association Football XI, 1899–1901; Lawn Tennis, 1900–1. In Legal Secretary's Office, Khartoum, Sudan Civil Service. 2nd Lieut. Yorkshire Hussars.

Strutt, George Aston. *b.* 24 Nov. 1878. Harrow. Matric. 1897. Captain 'Varsity Shooting VIII, 1899–1901. *m.* 1904 Hon. Winifred Cavendish. J.P.; Derbyshire County Council; Major, Derbyshire Yeomanry.

Vickers, Vincent Cartwright. *b.* 16 Jan. 1879. Eton. Matric. 1897. *m.* i. 1905 Mairi Clark, ii. 1910 Nannette Leslie. Director of Messrs. Vickers, Sons, and Maxim, Ltd., and of London Assurance Corporation.

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Whitnall, Samuel Ernest. *b.* 30 March, 1876. Radley. III Zool. 1901; Welsh Memorial Prize, 1903; M.B. 1908; M.R.C.S., L.R.C.P. 1908; Radcliffe Prize, 1913. *m.* 1908 Zoe Wyllie. University Demonstrator in Anatomy, Oxford; Hon. Sec. Section of Anatomy, Brit. Med. Assoc. 1912. Lieut. R.A.M.C., Base Hosp., Oxford, 1915.

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Hilton, Harold. Fellow, 1898–1906. Prof. of Mathematics, University of London.

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Medlicott, Walter Sandfield. *b.* 28 Aug. 1879. Harrow. Matric. 1898. *m.* 1910 Lavender, daughter of Alfred Pease, Bart. Lieut., Northumberland Hussars.

Neave, Sheffield Airey. *b.* 20 April, 1879. Eton. III Zool. 1902. O.U. Athletic Team, 1899 and 1901. Naturalist on Geodetic Survey of Rhodesia, 1903. *m.* 1915 Dorothy, da. Lieut.-Col. Middleton.

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Scholar, 1902; Hon. mention, Rolleston Memorial Prize. Demonstrator in Geology, 1903. F.G.S. Jun. Inspector of Schools, 1903. *m.* 1904 Kate V. Stewart.

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Webb, Arthur James. *b.* 2 Nov. 1879. Dulwich. Ex.; II Chem. 1901. B. Sc. Lond. 1901. *m.* 1908 Edith M. Peet. Research Chemist with Messrs. Johnson, Matthey & Co.

Dutton, Henry Hampden. *b.* 13 Feb. 1879. St. Peters, Adelaide, and Lancing. III Geol. 1902. O.U. VIII, 1900. *m.* 1905 Emily Martin. Landholder and Stockbreeder, Anlaby, Kapunda, S. Australia.

Across Australia by Motor. 1908.

1899.

de la Rue, Ivor Andros. *b.* 2 Dec. 1880. Eton. III Chem. 1902. Rackets, 1901–2.

Galloway, John. *b.* 8 March, 1881. Charterhouse. III Physiol. 1903. Of the Inner Temple, 1903.

Girdlestone, Morrell Andrew. *b.* 29 April, 1879. Weymouth. Lieut. Royal Garrison Artillery, 1902; Native Artillery, India, 1903; Capt. 41st Dogras, Indian Army, 1909. *Shot* by a sniper when on the look-out in the trenches, April 1915.

Monck, George Stanley Stevens. Son of W. B. Monck (*Daub. Reg.* p. 106). *b.* 1880. Eton; matric. 1899.

Riley, Percy Herbert. *b.* 12 April, 1880. Eton. IV Chem. 1903. *m.* 1904 Eliza Gertrude Littleton. Music printer.

Semon, Henry Charles Gustav. *b.* 9 March, 1881. Clifton, II Physiol. 1903; S. Univ. Coll. Hosp.; M.R.C.S., L.R.C.P. 1905; M.D. 1911.

Simonds, John Hayes. *b.* 16 April, 1879. Wellington. B.A. 1900. Major, Royal Berkshire Regiment, 1915. Banker (J. and C. Simonds and Co., Reading Bank).

Stewart, David Macfarlane. *b.* 31 Oct. 1878. Hutcheson's Grammar School, Glasgow; Glasgow Univ. D.; I Math. Mods.; II Cl. Mods.; I Physics; II Lit. Hum.; I Math.; II Law. I.C.S. 1902, Bengal; Under Sec. to Government, April, 1907–8; Joint Magistrate and Dep. Collector U.P. 1912.

Sturrock, William Duncan, *b.* 16 May, 1880. Charterhouse. Ex.; I Physiol. 1903; S. King's Coll. Hosp.; M.B. 1906; M.R.C.S., L.R.C.P. 1905; M.D. 1912; Surg.-Capt. O.T.C.

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Walker, Bertram James. Matric. 1899. 2nd Lieut. Northamptonshire Imperial Yeomanry, South Africa. Capt. 8th R. Sussex Regt. 1915.

1900.

Clowes, George Charles Knight. *b.* 5 July, 1882. Winchester; matric. 1900. Member of Firm of W. Clowes and Sons, Ltd., Printers. Capt. London Scottish, 14th Batt. County of London.

Knight, John Guy Douglas. *b.* 18 Oct. 1881. Charterhouse; matric. 1900. Served in South Africa. *m.* 1900 Ruby Feilde. Farming in Manitoba, Canada.

Wallin, Charles Ethelbert. *b.* 26 Oct. 1881. Brackley School. Ex.; III Math. Mods.; II Chem. 1903. Analytical Chemist in the Steel Works of Messrs. Cammel, Laird, Sheffield. In Steel Works in New Brunswick, 1914. Gasworks Products, Sydney, Nova Scotia, 1915.

Newbold, William. II. Lit. Hum. 1901. Made some use of the Cooke Equatorial Telescope and reported on its capabilities. F.R.A.S. Asst. Master, Tonbridge School. Lieut. 119th Heavy Battery R.G.A.

1901.

Douglas, Claude Gordon. *b.* 26 Feb. 1882. Wellington. D.; matric. New College, 1900; I Physiol. 1904; B.Sc. 1906; M.D. 1913; S. Guy's Hosp.; Radcliffe Prize, 1911. Fellow and Lecturer St. John's College, 1907–. Lieut. R.A.M.C. Military Cross, 1916.

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Everitt, Charles. *b.* 23 Jan. 1882. E. London College. D.; I Math. Mods.; I Chem. 1902; IV Geol. 1903. On staff of 'Encyclopaedia Britannica'.

Martin, Charles Herbert George. *b.* 5 Oct. 1881. Eton. II Zool. 1904; Rolleston Memorial Prize, 1910. Asst. to Sir J. Murray's Survey of Freshwater Lochs of Scotland, 1905; Asst. Lecturer Glasgow University, 1909. *m.* 1912 Beatrice, daughter of Ferd. Hanbury; Master of Crickhowell Harriers, 1912. Lieut. 3rd Monmouths. *Killed in action*, 4 May, 1915.

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Daniel, William Rothwell. D.; II Math. Mod.; I Chem. 1903. In S. Africa, 1903.

de la Rue, Stuart Andros. *b.* 29 May, '83. Eton. Matric. 1901; went down 1903. *m.* 1912 Margaret, daughter of Alex. Wedderburn, K.C.

Fisher, Kenneth. *b.* 18 July, 1882. Manchester Grammar School. D.; II Chem. 1904; Sen. D. 1905; Ph.D. Jena, 1906. Asst. Master, Clifton College. *m.* 1911 Constance, daughter of James Boyd. Lieut. O.T.C., Clifton College.

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Potter, Ley Francis. *b.* 27 Feb. 1882. Wyggeston and Worcester Royal Grammar Schools. D.; I Chem. 1904; Heidelberg, 1905–6, Ph.D. King's School, Coventry, 1904. Senior Science Master, Hulme Grammar School, Oldham, 1906.

Meade-Waldo, Geoffrey. *b.* 8 Jan. 1884. Eton. M.A. 1911. Assistant in Entomological Dept., British Museum. † 11 March, 1916.

On new species of Diploptera in the British Museum.
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Flower, Conrad Herbert. *b.* 29 April, 1882. Winchester. Entered Motor-car business, 1903. Capt. 16th Batt. Q. O. Westminsters.

1902.

Stewart, Robert Henry Rynn. *b.* 18 Sept. 1883. Wellington. II Chem. 1905. Barrister-at-Law, co. Dublin. R.N.R. 1915. *m.* 1915 Edith, da. of Lt.-Col. E. C. Martin.

Ackers, Charles Penrhyn. *b.* 28 June, 1882. Eton. II Chem. 1905; B.Sc. Durham. Of Huntley Manor, Glos. Farming. Lieut. A.S.C.

Aldridge, Frederick James. *b.* 2 July, 1893. Worcester Grammar School. III Physiol. 1906; M.R.C.S., L.R.C.P. 1909; M.B. 1910 St. Thomas's. Medical Practitioner in Glastonbury.

Bethell, Hon. Richard. *b.* 26 April, 1883. Eton. *m.* 1911 Evelyn, daughter of late Colonel Hutton, C.B. 2nd Lieut. Scots Guards, 1914.

Carlisle, Kenneth Methven. *b.* 7 Aug. 1882. Harrow. B.A. 1905. Capt. O.U.C.C. 1905. *m.* 1907 Minnie Donner. Merchant.

Gardner, Thomas Edward. *b.* 3 June, 1883. Bradford. Ex.; II Chem. 1905.

The action of tribromo-propane on the sodium derivative of ethyl aceto acetate. [With Prof. Perkin.] *J. C. S.* 1907.

Osborne, Charles Glidden. *b.* 9 Feb. 1884. Charterhouse. Now in U.S.A.

Stancomb, John. *b.* 1 Dec. 1883. Son of William Stancomb (see *Daub. Reg.*, p. 114).

Dinham, Charles Hawker. *b.* 7 July, 1883. Haileybury. Classical Ex.; III Chem. 1906; I Geol. 1907; Hon. mention for Burdett-Coutts Schol. 1907. Completed the naming and arrangement of the Stratigraphical Geological Collections in the Oxford Museum. Asst. to Geological Survey and Museum, Edinburgh.

1903.

Morrell, James Herbert. *b.* 9 July, 1882. Eton. III Cl. Mod. 1903; III Phys. 1905. O.U.A.C. 100 yds. 1904–5; ¼ mile 1902, 4, 5; ½ mile 1903. Barrister-at-Law. *m.* 1913 Julia, daughter of Sir G. Denton, K.C.M.G. Lieut. O.U.O.T.C.

Stobart, James Douglas. *b.* 25 April, 1884. Radley. B.A. 1905. Spare man, Varsity VIII, 1904. In business. Lieut. 2nd London Divisional Train A.S.C.

Fry, Herbert John Burgess. *b.* 19 June, 1885. Charterhouse. Ex.; I Physiol. 1907; B.Sc. 1909; M.B. 1911; M.R.C.S., L.R.C.P. 1911. Biological Scholar at Naples, 1908; Asst. Director Pathological Department, St. Thomas's Hosp.

Influence of the Visceral Nerves upon the Heart in Cephalopods. *J. Physiol.* 1909.

Blood Platelets and the Coagulation of Blood in Marine Chordata. *Folia Haematologica*, 1910.

Decalcifying action of Oxalic Acid Poisoning. *Lancet*, 1913.

Nalder, Howard Gilbert. *b.* 21 March, 1884. Charterhouse; read Botany. Interested in Motoring.

Beevor, Charles Ferrier. *b.* 10 Sept. 1884. Charterhouse. III Chem. 1906; M.B. 1912. Univ. Coll. Hosp.; late House Surgeon, Charing Cross Hosp. *m.* 1910 Janne Macbeth.

Birchall, Edward Vivian Dearman. *b.* 10 Aug. 1884. Eton. IV Chem. 1907. Hon. Sec. National Association of Guilds of Help and of Agenda Club; Capt. Bucks. Batt. Oxf. & Bucks L.I.

Dutton, Francis Bridger. *b.* 21 Sept. 1885. Eton. III Chem. 1907. *m.* 1913 Sydney Eleanor, daughter of Capt. Cecil Montagu. Barrister-at-Law, 1910; Medical Student, 1915.

Hubbard, Hon. **Raymond Egerton.** *b.* 1884. Eton. III Chem. 1907. Member of firm of John Hubbard & Co., St. Petersburg.

Willett, Herbert William Mills. *b.* 28 July, 1884. Rugby. III Chem. 1906. Member of firm of William Willett, Builder, London.

Pratt-Barlow, Robert Francis. *b.* 26 Aug. 1885. Charterhouse. Worked at Physics for a short period. Member of firm of John Dickinson & Co., paper-makers.

1904.

Stokes, Edward. *b.* 1880. St. Peter's, Adelaide. III Chem. 1906. *m.* 1909 Mary Ram. House Master, Queen's School, Adelaide, 1902–3; Science Master, King William's College, Isle of Man, 1907–8; Head Master, Government High School, Bareilly, U.P., India, 1908–.

Tizard, Henry Thomas. *b.* 23 Aug. 1885. Westminster. ⚭.; I Math. Mods.; I Chem. 1908. Worked in Prof. Nernst's Lab., Berlin, Oct. 1908–July 1909; Magd. Coll. Lab. Sept. 1909; Master at Eton, Nov. 1909. Fellow and Lecturer in Nat. Science, Oriel, 1911–. 2nd Lieut. R.G.A. 1914. *m.* 24 April, 1915, Kathleen Eleanor Wilson.

The Colour Changes of Methyl-Orange and Methyl-Red in Acid Solution. *Trans. Chem. Soc.*, 1910.

The Hydrolysis of Aniline Salts measured colorimetrically.

The Mechanism of Tautomeric Change. *Proc. Chem. Soc.*, 1910.

Nernst's *Theoretical Chemistry.* [Translation.] 8°, 1911.

On the Velocities of Ions in Dried Gases. [With R. T. Lattey.] *P. R. S.*, p. 349, 1912.

Effect of a Magnetic Force on the Motion of Negative Ions in a Gas. [With J. S. Townsend.] *P. R. S.*, p. 357, 1912.

Glover, Harold Matthew. *b.* 29 Oct. 1885. Royal Grammar School, Worcester. 𝔇.; I Math. Mods.; I Geol. 1907; Diploma of Forestry, 1908. Indian Forest Service.

Walling, Ernest. *b.* 11 Dec. 1885. Giggleswick. 𝔈*x*.; II Chem. 1907. Math. Master, Dulwich Prep. School, 1909; Research with H. Baker at Ch. Ch., Lent, 1910; Oxford High School, 1910–12; Sen. Science Master, Leeds Grammar School, 1912–. Lieut. 7th Batt. W. Yorks. Regt.

Downs, George Edward. *b.* 18 Sept. 1885. Royal Grammar School, Worcester, II Physiol. 1908; M.B. 1911. Late Sen. House Phys., St. Thomas's. *m.* Aileen Lingard Escombe, 1916.

Clarence, George Clarence. *b.* 2 Mar. 1885. Radley. III Botany, 1909.

Carr-Saunders, Alexander Morris. *b.* 14 Jan. 1886. Eton. I Zool. 1908. Naples Biol. Student, 1908–9; Demonstrator at Oxford, Mich. 1909–Lent 1910; Research with Karl Pearson at Univ. Coll. London, Summer 1910. Lieut. A.S.C.

The Development of Aplysia punctuata. [With Margaret Poole.] *Q. J. M. S.* Sept. 1910.

Pigmentation in relation to Selection and to Anthropometric Characters. *Biometrika*, viii, Jan. 1912.

A Criticism of Eugenics. *Eugenics Review*, Oct. 1913.

Garton, Charles Leslie, *b.* 19 May, 1885. Eton. B.A. 1907. Member of firm of Garton & Co., Glucose manufacturers.

1905.

Laws, Ernyst Graham. *b.* 26 June, 1886. Oxford City Technical School and Non-Coll. Student; 𝔇. 1905; I Chem. 1908; F.C.S. Research at Magd. Coll. on Uranium Glass, 1908; B.Sc.; Master at Oxford City Tech. School, 1903–9; Science Master, County Secondary School, Ramsgate, 1909–.

Isomeric Acetaldehydephenyl hydrazones. *T. C. S.* xcix.

Priest, Carl Rhodes. *b.* 22 May, 1886. Christ's Hospital. 𝔈*x*. 1905; Math. Asst. Master, St. Neot's, Eversley, Hants. *Died* of wounds, France, 22 Jan. 1916.

Lloyd, Stephen Pemberton Lucius. *b.* 24 Aug. 1886. South-Eastern Coll., Ramsgate. Won the mile against Cambridge, 1907, in 4 min. 28 sec., and again in 1908.

Odling, Marmaduke. *b.* 3 July, 1886. Radley, 1905. II. Geol. 1908; B.Sc. 1912. F.G.S. Assistant to Professor of Geology, Leeds University, 1914–.

The Radley District: Geology, pp. 98–123.
8°, Parker, Oxford, 1912.

The Bathonian Rocks of the Oxford District. *Q.J.G.S.* lxix, 1913.

Fossil Fauna of the Oxford District. Part. i.
Rep. Ashmolean Soc. 1915.

The Relations between the various facies of the Upper and Middle Oolites in different districts of England and N.W. France. *Proc. Yorks. Geol. Soc.* 1916.

Chemical Composition of Conisborough Permian. An Appendix.
Proc. Yorks. Geol. Soc. 1916.

In preparation (1916):—

Notes on the Corallian of the Oxford District, with special reference to the Occurrence of a 'Pebble Bed' at a constant horizon.

Report on Geological Sections exposed during the widening of the G.N.R. between Essendine and Corby.

Bathonian of Northamptonshire and Buckinghamshire.

Suggestions of Land Ice at Cumnor.

Oxford Fossil Fauna. Part 2. Cretaceous Brachiopoda. Part 3. Bathonian Pelecypoda. (*Ashm. N. H. Soc.*)

Sparrow, Walter Geoffrey Kay. *b.* 1887. Charterhouse. Lieut. Cheshire Yeomanry.

Robertson, Manning Durdin. *b.* 29 May, 1887. Eton. Architect. *m.* 1912 Nora, daughter of Lt.-General Sir Laurence Parsons, K.C.B.

Robinson, Roy Lister. St. Peter's, Adelaide. Rhodes Scholar, I Geol. 1907; Burdett-Coutts Scholar, 1907. Won the weight competition against Cambridge, 1907 (37 ft. 7 in.). Sec. to Advisory Committee on Forest Development and Superintendent of Forest Inspection. At Dept. of Explosives Supplies, Ministry of Munitions, 1915.

Moulton, John Coney. *b.* 11 Dec. 1886. Eton. B.Sc. 1912; F.L.S., F.Z.S., F.E.S., M.B.O.U. Curator of Rajah Brooke's Museum, Sarawak. Lieut. 4th Batt. Wilts Regt.

On the Lepidoptera Rhopalocera collected by W. J. Burchell in Brazil, 1825–30. VI. Nymphalinae.
Ann. & Mag. Nat. Hist. ii, p. 195; iii, pp. 7–20, 98–111. 1908–9.

On some of the principal mimetic (Müllerian) combinations of tropical American butterflies. *Trans. Ent. Soc.* 1909.

A list of the Bornean Cicindelidae. *Notes Leiden Mus.* xxxii, 1910.

A contribution to the study of the insect fauna of Borneo. A List of the Bornean *Buprestidae*. *J. Sarawak Mus.* i, 1911.

Two new *Cicada* from Sarawak, with a note on the Bornean species of the genus *Cosmopsaltria*. *J. Sarawak Mus.* i, 1911.

Material for a Fauna borneensis: a list of Bornean Cicadidae. *J. Straits Asiatic Soc.* lvii, 1911.

A list of the butterflies of Borneo with descriptions of new species. Part iii, Lycaenidae. *J. Straits Asiatic Soc.*1911.

On some unintentional evidence in support of the mimicry theories, supplied by a small collection of Bornean butterflies. *Ent. Mo. Mag.* xlviii, 1912.

Butterflies taken on the Batu Lawi expedition. *J. Straits Asiatic Soc.* lxiii, 1912.

Some additional notes on *Buprestidae* found in Sarawak, together with a brief comment on the geographical distribution of all the species of Buprestidae now known from the Island of Borneo. *J. Sarawak Mus.* i, 1912.

Museum Notes on the fungus parasites of insects. *J. Sarawak Mus.* i, 1912.

'Where Wallace trod': being some account of an entomological trip to Mt. Serambu, Sarawak, Borneo. *Entomologist*, Aug.–Sept. 1912.

An expedition to Mt. Batu Lawi; with appendices on some of the collections made by H. N. Ridley, C.M.G., F.R.S; E. B. Copeland, J. J. Smith, Dr. A. Griffini, F. F. Laidlaw, M.D., F.Z.S., and J. C. Moulton, with a map, plate, and 4 text-figures. *J. Straits Asiatic Soc.* lxiii, 1912.

On some new and little-known Bornean *Lycaenidae*; together with a revision of the Thecline genus *Thamala*, Moore. *Trans. Ent. Soc.* Lond. 1913.

A brief visit to Malacca. *Entomologist*, Oct. 1913.

Some notes on a short collecting trip to Mt. Poi, Sarawak. *J. Straits Asiatic Soc.* lxiii, 1913.

A collecting expedition to Mt. Kinabalu. *The Sarawak Gazette*, Nov. 1913.

The first reliable account of the Orang-utan (*Simia satyrus*, L.). *Zoologist*, Sept. 1913.

Zoological notes on a collecting expedition in Borneo. *Zoologist*, Oct. 1914.

A list of the Butterflies of Borneo. Part iv—Papilionidae. *J. Straits Asiatic Soc.* lxvii, 1914.

Hand-list of the Birds of Borneo. *J. Straits Branch R. Asiatic Soc.* pp. 125–91, 1914.

Annual Reports on the Sarawak Museum. 1908–14.

Some undescribed Bornean Nymphalidae. *Entomologist*, May 1915.

Cox, Cuthbert Eustace Connop. *b.* 9 Mar. 1885. Bradfield. Forestry Student. Asst. Conservator Forest Department, Central Prov., India.

Osmaston, Arthur Edward. *b.* 4 Mar. 1885. Bedford. Forestry Student. Asst. Conservator Forest Department, United Prov., India.

Fenwick, Christian Bedford. Eton. M.A. 1912. Barrister-at-law. Capt. N. Cyclist Batt., T.F. *m.* 1915 Mary B. Wait.

Rice, Guy Vere. *b.* 8 Nov. 1888. Merchant Taylors and Forest School, Walthamstow. Math. 𝔇.; III Physics, 1909.

1906.

Hammick, Dalziel Llewellyn. *b.* 8 Mar. 1887. Whitgift School. 𝔇.; I Chem. 1909. Studied at Munich. Master, Gresham's School, Holt, 1910. *m.* 1911 Philippa, daughter of Assheton Tilbrook.

Atoms. *Translation of Perrier's Les Atoms.* In the Press.
A Preliminary Organic Chemistry. In Preparation.
Some new reactions of sulphur dioxide. Part i with metal oxides. In prep. for *J. C. S.*

Venables, John Frederick. *b.* 17 Jan. 1888. Magd. Coll. School. 𝔈𝔵.; III Physiol. M.B. 1913. Guy's Hospital. *m.* 1914 Helen Cox.

Greene, Barrington Stopford Conyngham. *b.* 8 June, 1888. Eton. Civil Engineer.

Ogilvie, Alan Grant. *b.* 3 July, 1887. Westminster. II Hist. 1909. Librarian and Lecturer, School of Geography, 1912; Albert Kahn Travelling Fellow, 1914; Lieut. 7th London Brigade, R.F.A. Awarded Cuthbert Peek Grant of R. Geographical Society, 1915.

Some recent observations and theories on the Structure and Movement of Glaciers of the Alpine type. *Geogr. Journal*, Sept. 1912.
Morocco and its Future. *Geogr. Journal*, June 1912.
Notes on Moroccan Geography. *Geogr. Journal*, March 1913.
An English Desert. *Geogr. Journal*, June 1913.
The Physical Geography of the Entrance to Inverness Firth. Paper read at *British Association*, Sept. 1913.
Impressions of the Vegetation in the United States of America. Oct. 1913.
Cartographic Needs of Physical Geography. *Geogr. Journal*, Jan. 1915.

Cardwell, Ronald McKenzie. *b.* 9 July, 1887. Clifton. B.A. 1909. Lieut. Sussex Yeomanry.

Parry-Jones, Owen Guy. *b.* 14 June, 1887. Sherborne. Acad. Clerk; B.A. 1910. St. Thomas's Hospital. Lieut. 3rd Res. Batt. Lanc. Fusiliers.

1907.

Somervell, Donald Bradley. *b.* 24 Aug. 1889. Harrow. D.; II Math. Mods.; I Chem. 1911. Fellow of All Souls College, 1912. Lieut. 9th Batt. Middlesex Regt.

The velocity of reaction between potassium chloro-acetate and some aliphatic amines. [With Moore and Derry.]
J. C. S. 1912.

Coventry, Alan Freeth. *b.* 23 Sept. 1888. Willaston School. Ex.; II Zool. 1910. Asst. to Linacre Prof., Oxford, 1911; Superintendent of Bute Natural History Museum, Rothesay N.B., 1911; Lecturer in Vertebrate Embryology, Toronto, 1912.

Wilkie, Archibald Hanning. *b.* 1 Sept. 1889. Fettes. 2nd Lieut. K.R.R.C. Mentioned in dispatches.

Strutt, Geoffrey St. John. *b.* 28 Mar. 1889. Winchester. Stock Exchange. *m.* 1912 Sybil, daughter of Sir Walpole Greenwell, Bart. 2nd Lieut. 5th Batt. Essex Regiment.

Barnes, Henry Durell. *b.* 9 Aug. 1888. Tonbridge.

Ray, William. *b.* 19 June, 1883. Adelaide Univ. 1902–7, M.B. and B.S. 1906; Rhodes Scholar; B.Sc. 1909; Philip Walker Student in Pathology, 1910.

Observations on the relationship between the blood-volume and the total amount of Agglutinin recoverable from actively and passively immunised animals. [With Georges Dreyer.]
Journ. of Path. and Bact. xiii, 1909.

The blood-volume of mammals as determined by experiments on rabbits, guinea-pigs, and mice, and its relationship to the body weight and to the surface area expressed in a formula. [With Dreyer.] *Phil. Trans.* B. cci, pp. 133–60, 1910.

Further experiments upon the blood-volume of mammals and its relation to the surface area of the body. [With Dreyer.]
Phil. Trans. B. ccii, pp. 191–212, 1911.

The blood-volume of rabbits. [With Dreyer and E. W. A. Walker.] *Journ. of Path. and Bact.* vol. xvii, p. 143, 1912.

The size of the aorta in certain animals and its relation to their body weight. [With Dreyer and E. W. A. Walker.]
Journ. Phys. vol. xliv, and *Proc. Physiol. Soc.* May 18, 1912.

The relation between the sectional area of the trachea and the body weight in certain animals. [With Dreyer and E. W. A. Walker.]

Journ. Phys. vol. xlv, from *Proc. Physiol. Soc.* June 29, 1912.

The size of the aorta in warm-blooded animals and its relationship to the body weight and to the surface area expressed in a formula. [With Dreyer and E. W. A. Walker.]

P. R. S. B. lxxxvi, 1912.

The size of the trachea in relationship to the weight, the surface area, the blood-volume, and the size of the aorta. [With Dreyer and E. W. A. Walker.] *P. R. S.* B. lxxxvi, 1912.

On the blood-volume of warm-blooded animals; together with an inquiry into the value of some results obtained by the carbon-monoxide method in health and disease. [With Dreyer and E. W. A. Walker.]

Skandinavisches Archiv für Physiologie, Band 28, 1913.

1908.

Harper, Alan Gordon. *b.* 5 Jan. 1889. Dulwich. 𝔇. II Botany, 1912; Demonstrator, Bangor, 1912; to Prof. Somerville, Oxford, Jan. 1913; Temporary Professor at Presidency College, Madras, 1914; Chapman Research Prize, 1914. Trooper in Southern Provinces Mounted Rifles, Motor Cyclist Section, 1914. Lieut. 3rd Batt. (Reserve) R.F.A. 1915.

Defoliation: its Effects upon the Growth and Structure of the Wood of Larix.

Annals of Botany, xxvii, pp. 621–42, 2 pls., Oct. 1913.

Protomorphic Shoots in the genus Pinus.

Quarterly Journal of Forestry, 6 pp., 1 fig., Apr. 1914.

Experiments on Eccentric Growth of Ash. [With Prof. Somerville.] *Q. J. F.*, 11 pp., 1 pl., July 1914.

(Unpubl. 1914) Fusion of Needles in Pinus.

Studies in the Formation of Autumn Wood in Conifers.

Winmill, Thomas Field. *b.* 13 Sept. 1888. East London Tech. School. 𝔈𝔵.; III Math. Mods.; I Chem. 1911; 𝔖𝔢𝔫. 𝔇. 1912; Chapman Research Prize, 1912. Mackinnon Student of Royal Society 1912 for Research in Structural Chemistry. Doncaster Coalowners' Research Lab. 1914–. *m.* 1913 Marjorie, daughter of R. Clarke.

Association of phenols in the liquid condition. [With J. T. Hewitt.] *J. C. S.* 1907.

Arsenic diiodide. *J. C. S.* 1907.

Studies in the azine series. Pt. I. The constitution of safranine. [With J. T. Hewitt.] *J. C. S.* 1909.
The state of amines in aqueous solutions. [With Moore.] *J. C. S.* 1912.
Arsene. *J. C. S.* 1912.

Clemes, Alfred Willis. *b.* Hobart, 4 Sept. 1887. Tasmania Univ. Rhodes Scholar; I Geol. 1910. First place in Cross-Country Running, 1908.

Garton, Arthur Stanley. *b.* 31 Mar. 1889. Eton. B.A. 1911. Varsity VIII, 1909–11.

Cudmore, Milo Massey. *b.* New South Wales, 2 May, 1888. St. Peter's, Adelaide. B.A. 1911. Varsity VIII, 1908–9. Read for Bar. 2nd Lt. R.F.A. Military Cross.

Angas, Ronald Fife. *b.* S. Australia, 29 April, 1889. St. Peter's, Adelaide. B.A. 1911.

1909.

Acland, Lauchlan Henry Dyke. *b.* 15 April, 1889. Bath. III Chem. 1912. Studied in Munich; Analytical Lab. in London, 1914. Corp. 8th (Service) Batt. K.R.R.C.

Ritchie, Archibald Thomas Ayres. *b.* 2 April, 1890. Harrow. D.; III Zool. 1913. Caporal 3ième Compagnie Bataillon C, 2ième Régiment, Légion Étrangère, 1914. 2nd Lieut. Gren. Guards, 1915. *Wounded,* Sept. 28, 1915. Awarded the Military Cross, for conspicuous gallantry.

Walker, Frederick Clarkson. *b.* 1891. Church Inst. School, Bolton. Math. D.; aegrot. Physics 1913.

Ball, Percy. *b.* 2 Feb. 1890. Rugby. Ex.; II Chem. 1912. Sudan C.S.

Vernon, William Norman. *b.* 19 April, 1890. Charterhouse. B.A. 1914.

Cavenagh, John Bernard. *b.* 10 July, 1890. Worcester Cath. King's School. II Physiol. 1913.

Hassard, William Algernon. *b.* 30 Jan, 1891. Charterhouse. Commoner, 1909–.

Symon, Oscar Sturt. *b.* S. Australia, 28 Mar. 1891. St. Peter's, Adelaide. Left, in middle of Final Geology Exam. First Class Diploma and Ridley Prize at Roseworthy Agricultural College, and Gold Medallist, R. Agric. and Hort. Soc. S. Australia (Adelaide *Advertiser*, 13 March, 1915).

1910.

Evans, Griffith Ifor. Univ. Coll. Bangor. Acad. Clerk; II Physiol. 1914. Lieut. R.A.M.C.

Sunderland, James. *b.* 1 Feb. 1891. Manchester Grammar School. Ex.; II Physics, 1914.

Goldsworthy, Leonard James. *b.* 12 Dec. 1890. Ripon Grammar School. Ex.; II Chem. 1913. Professor of Chemistry, Victoria College of Science, Nagpur, 1914–.

Resolution of trans-cyclo Pentane-1 : 2-dicarboxylic Acid. [With W. H. Perkin, jun.]

Carboxylic Acids derived from cyclo-Butane, cyclo-Pentane, cyclo-Hexane, and cyclo-Heptane. [With W. H. Perkin, jun.] *J. C. S.* Nov. 1914.

George, Hugh Shaw. *b.* 29 Jan. 1892. Sexey's School, Bruton. Ex.; I Botany, 1913. At Fulda, Germany, 1913; President Junior Scientific Club, 1913. Indian Forest Service, 1915.

Paterson, John Carruthers. *b.* 9 Sept. 1891. Fettes. III Physiol. 1914. Capt. 9th Batt. Liverpool Regiment. *Wounded,* 7 Oct. 1915.

Smyth, Geoffrey Meliss. *b.* 6 July, 1892. Lynam's and Winchester. III Physiol. 1914. Lieut. 6th (Service) Batt. Loyal N. Lancs.

1911.

Chapman, Edward Frederick. *b.* 15 Mar. 1893. Monckton Combe. D. Studied in Tübingen, 1913. I Chem. 1915. 2nd Lieut. 14th R. Fusiliers, 1915.

Bennett, George. *b.* Batavia, 1892. Sherborne. D.

Balfour, Isaac Bayley. *b.* 19 Oct. 1889. Son of Prof. I. B. Balfour, late Fellow of Magdalen. Winchester. Lieut. 3rd Batt. R. Scots. *Killed in action,* Aug. 1915.

Thomson, Cater Hyde. *b.* 1893. Harrow. Left, owing to bad health, 1912.

Hodgkinson, Noel Alexander. *b.* 30 Dec. 1891. Rugby. Capt. 3rd Batt. R. Warwicks.

Horsfall, Ewart Douglas. *b.* 24 May, 1893. Eton. O.U. VIII, 1912–14. 2nd Lieut. 9th (Service) Batt. Rifle Brigade; attached to R. Flying Corps. Chevalier of Legion of Honour, Nov. 1915. Temp. Captain, 1916. Military Cross.

1912.

Browne, William Laurence Fraser. *b.* 15 June, 1893. Winchester. Math. ℳ. 2nd Lieut. R.F.A.

Prevett, Reginald Arthur Charles. *b.* 15 May, 1894. Wyggeston. ℳ. 2nd Lieut. 5th Batt. Yorks L.I.

Vernon, Herbert Douglas. *b.* 4 Jan. 1893. Charterhouse. 2nd Lieut. 7th Batt. Liverpool Reg.

Bird, Ashley Hinckes. *b.* 22 April, 1893. Westminster. 2nd Lieut. 9th (Service) Batt. Somerset L.I. *Wounded,* Suvla Bay.

Carr, John Lillingston. *b.* Bangalore, 16 May, 1892. St. Lawrence Coll. Lieut. 3rd Batt. R. Berks.

Britten-Jones, Edmund. *b.* S. Australia, 8 Oct. 1888. Adelaide Univ. Rhodes Scholar; I Physiol. 1914. Lieut. R.A.M.C.

1913.

Halsey, Francis William. *b.* 18 June, 1894. Gresham's School, Holt. ℳ. 4th (Cyclist) Batt. Hants. 2nd Lieut. R.G.A. *Killed in action in France,* 15 Nov. 1915.

Obit. notices in *Oxf. Mag.* and *Gresham,* 18 Dec. 1915.

Rubie, Howard Ernest. *b.* 15 Dec. 1894. R. Masonic School, Bushey. Ex. Works Chemist at Messrs. Chance and Hunt's new works for manufacture of Trinitrotoluol at Oldbury.

Parnell, John Atherton Parnell. *b.* 1 Mar. 1895. Winchester. R.M.C. Sandhurst. 2nd Lieut. Glos. Regt.

Long, William Henry Thorp. *b.* 8 Oct. 1894. Blundell's School. 2nd Lieut. 5th (Service) Batt. Dorsets.

Berners, Geoffrey Hugh. *b.* 20 Nov. 1893. Eton. 2nd Lieut. 3rd Batt. Norfolks.

de Bernière Smith, Lothrop Lewis. *b.* 24 Aug. 1893. Charterhouse. 2nd Lieut. 6th Batt. Rifle Brigade.

Upton, Hon. Henry Augustus George Mountjoy Heneage. *b.* 24 Aug. 1894. Eton. 2nd Lieut. East Kent Yeomanry.

von Mendelssohn-Bartholdy, Hugo Otto Paul Karl Felix. *b.* 3 Aug. 1894. Gymnasium in Potsdam. ? German Army 1914.

Madigan, Cecil Thomas. *b.* S. Australia, 15 Oct. 1889. B.Sc. in Applied Science, Adelaide University. Member of Sir Douglas Mawson's Antarctic Expedition. F.R.G.S. Arctic Medal, 1915. Lieut. 76th Field Co. Royal Engineers. *m.* 20 Aug. 1915 Wynnis, e. da. of T. C. Wollaston, of Sunningfield, Glenelg, S. Australia. *Wounded*, Oct. 1915.

1914.

Gainsborough, Richard (formerly **Ginsburg, Rudolph**). ℗. Medical Student.

Hodgson, Francis Herbert. ℗. Medical Student. Candidate for R. Flying Corps. Royal Aero Club Certificate, No. 2325, 1916.

Parsons, Eric King. ℰx. 2nd Lieut. 9th S. Batt. Rifle Brigade.

Furniss, Arnold Edeson. ℰx. 2nd Lieut. 5th Batt. York and Lancaster Reg.

Hopkins, Herbert Oxley. St. Peter's, Adelaide. 2nd Lieut. 7th Batt. King's Liverpool Regt.

Harvey, Robert Alexander. Passed 4th into Royal Navy, obtaining highest marks in Science, 1915. Appt. to *St. Vincent*, '16.

[**Reynaert, Joseph.** Med. Student of Louvain Univ., 1914.]

1915.

Lewthwaite, Raymond. Acad. Clerk. Medical Student. 2nd Lieut.

Windram, Reginald Whitmore. Williams College, Mass., U.S.A.

Read, Dunstan. Magd. Coll. School. 2nd Lieut.

Engleheart, Francis Henry Arnold. Grandson of J. G. D. E., p. 84.

[**Du Trieu de Terdonck, Charles.** Engineering Student of Louvain.]

1916.

Shaw, Walter Reginald Courtenay. Harrow.

Fraser, Henry Douglas Forbes. Malvern College.

Register of Persons (not Members of Magdalen College) who have worked in the Daubeny Laboratory during the period 1893–1915.

1893.

Liddell, Henry Andrew. Non-Collegiate, B.A. 1896. Head Master of Wesleyan School, Oxford.

Judge, Thomas. St. John's, I Chem. 1896. Professor of Chemistry at Bangkok.

Phillips, Harry Edward William. Non-Collegiate, II Chem. 1895. B.Sc. Science Master of Boys' High School, Oxford, and Training College for Girls, Banbury Road, Oxford. Vice-Principal Oxford Univ. Day Training College, 1905.

The Electrical Conductivity of Phosphoric Acid. *J. C. S.* 1909.

1894.

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Hartland, Brantford. St. John's, M.A. 1900. Head Master Paignton College, 1903–.

Hughes-Games, Harold James Wynn. Ex. of Worcester, II Math. Mods. 1893; II Chem. 1895. Asst.-Master Royal Naval College, Osborne, 1904–.

Walter, Ralph. New College, III Chem. 1896. In business. 2nd Lieut. Cyclist Batt. Hants Reg.

Young, John William Alexander. New College, II Chem. 1896.

Bevers, Edmund Cecil. St. John's, II Physiol. 1897. Guy's; M.B. 1901; F.R.C.S. 1911; Hon. Asst.-Surgeon Radcliffe Infirmary, Oxford.

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Pinching, Charles James. St. John's, III Physiol. 1898; M.B. 1905. Surgeon Gravesend Hospital and Deputy Coroner, Gravesend.

Hastings-Wilson, David Herbert. St. John's, M.A. 1899.

Hoare, Charles Hervey. New College, aegrot. Chem. 1898. In Banking business.

Tyser, Lionel Robert. New College.

Farncombe, Edgar Leonard. St. John's, III Physiol. 1898.

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Carpenter, Henry Cort Harold. Postmaster of Merton, I Chem. 1896. Professor, Manchester School of Technology.

Chaundy, John Henry. M.P.S.

Johnson, Bertie Cecil. St. John's, III Chem. 1898. ? Farming in Canada.

Crum, Walter Erskine. New College, II Chem. 1897. In business, in India.

Bennett, George Lowe. Casberd Ex. St. John's, M.A. 1901. F.C.S.; Curate of St. Saviour, Everton, 1899.

Ryman-Hall, Bertie Ryman. St. John's, B.A. 1896.

Richards, Owen William. Fellow of New College. I Cl. Mod. 1894; II Physiol. 1896. Guy's Hospital, M.B. 1902; M.D. 1905; F.R.C.S. 1905; Surgeon Kasr-el-Ainy Hospital, Cairo; Professor Clin. Surg. Egypt Government School of Medicine; Surgeon Anglo-American Hospital, Gezireh. With I.Y. Hospital, Deelfontein, South Africa, 1900. D.S.O.

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Billinghurst, Walter Binsmead. S. St. John's, II Chem. 1898. M.B. 1904. In Shanghai, 1914.

Sparrow, Robert Burslem. Lincoln.

Spicer, Edward Clarke. New College, I Geol. 1899. Late Scholar of Trinity College, Melbourne, M.A. 1879; Queensland Mission, 1884–5; Java, 1885–6; Burdett-Coutts Scholar, 1899; Rector of Throwleigh, Devon, 1889–95.

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Frewin, James Gilbert. Non-Collegiate, I Chem. 1899. H.M. Inspector of Schools, Scotland.

Purnell, George Sykes. Non-Collegiate, IV Chem. 1900. Asst.-Master, County School, Sandown, I.W.

Freeman, Willie Ludford. St. Edmund Hall, III Chem. 1900; F.C.S.

Taylor, Arthur Henry. St. John's, IV Physiol. 1896. Farming at Medley Manor, Oxon.

Barber, Charles Harrison. Non-Collegiate, Shute S. 1897; I Physiol. 1900. King's Hospital; M.R.C.S., L.R.C.P. 1902. Captain, Indian Medical Service; Army Specialist in Operative Surgery.

Smith, Eric McLeod. Queen's, III Physiol. 1900; M.B. 1905; M.D. 1912. In practice at Brewassina, N.S.W.

1898.

Eling, Thomas Henry James. Non-Collegiate, III Chem. 1899.

Rowlands, David Ellis. Ex. Jesus, IV Phys. 1899. Vicar of Great Wollaston, 1904–13; Marden, 1914–.

Williams, Jeremiah. Jesus, III Chem. 1900. Headmaster County School, Abergele.

Soddy, Frederick. Postmaster of Merton, I Chem. 1899. Lecturer in Physical Chemistry and Radio-activity in the University of Glasgow. Cannizaro Prize of the Accademia dei Lincei. Professor of Chemistry, Aberdeen, 1914–.

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McMullen, Alexander Percy. Postmaster of Merton, I Chem. 1898; Brewer at Guinness's, Dublin.

Inman, Harold Mundee. St. John's, IV Physiol. 1901; St. Mary's Hospital. Captain, Indian Medical Service.

Day, William Leigh Maule. Exeter, B.A. 1899. M.B. 1902, M.D. 1906. In practice in Colchester.

Crosfield, George Henry. University, III Physiol. 1901.

Young, Harold Spencer. Balliol, III Chem. 1904. Sci. Master, Wallingford School, 1908–.

Grosvenor, Norman Edward. Brasenose, IV Physiol. 1899.

Baker, Henry Hugh. University, III Physiol. 1900.

Mullins, Arthur Francis. Keble. Secretary to Mr. Beit of Beit, Wertheimer & Co., S. Africa.

Tordoff, Bertram. Casberd S. of St. John's, I Physiol. 1902.

Hubble, Harry Oswald. St. Edmund Hall.

Roberts, Jonathan Hugh. Jesus, II Chem. 1901; B.A. Wales. Research work on Tropical Plants for Board of Agriculture, Jamaica, and on Negro and Half-Caste Races. Asst.-Master, Grammar School, Middleton, Lancs., 1912–.

Elford, Bertram. St. John's, aegrotat. Chem. 1902. Private School near Rochester, *c.* 1910.

Elford, Archibald Sefton. St. John's, III Chem. 1902. Inspector of Elementary Schools under the L.C.C.

Henderson, Turner. University, B.A. 1901.

1899.

Allen, Francis Wellwood. Jesus, IV Chem. 1902. †.

Spear, Robert Heron. Jesus, II Chem. 1899; Asst.-Master, Grammar School, Swansea, 1905–.

Tidy, Henry Letheby. New College, II Chem. 1900. President O.U. Jun. Sci. Club. London Hospital. M.B. 1905; M.R.C.P. 1908; M.D. 1911. *m.* Elizabeth, d. of Sir Wm. Ramsay.

Chemical Pathology of Gout. *Med. Ann.* 1907.
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Lee, Edward Cornwall. University.

Shelley, Arnold. Keble, B.A. 1899. London Hospital. M.B. '05. In practice at Chatham.

White, Thomas Richard. Non-Collegiate, IV Chem. 1901. Sen. Chemical Master, Roan School, Greenwich, 1901.

White, Robert Murray. Non-Collegiate, matric. 1897. Math. and Physics Master, Grammar School, Plymouth.

Bibby, Robert Gordon. New College, II Chem. 1903. Engaged in Financial Business.

Murray, Ælfric Charles Ruthven. Wadham, IV Chem. 1902. In S. African Civil Service. Now in Holy Orders.

Ping, Lawrence Spencer. Non-Collegiate, II Chem. 1901.

Billings, George Michael. Jesus, matric. 1896. Head Master Public School, Shanghai, China, 1908.

Griffith, William Edward. Non-Collegiate, B.A. 1902.

Pridham, Charles Albert. St. John's, III Chem. 1902. Asst.-Master, Ripon Grammar School.

Davis, John Sidney. Non-Collegiate, III Physics, 1902. Lecturer in Education, Culham College, 1906.

Laboratory Practice.

1900.

Cooper, Jabez Horace. S. Jesus, I Chem. 1903. F.C.S. Sen. Science Master, Lancing College, Shoreham, Sussex, 1913.

Baker, Sydney Harold. S. Jesus, II Chem. 1903. Sen. Science Master, Abingdon School; at Charlottenburg, 1903–4.

Naab, Frederick. Non-Collegiate, B.A. 1901; Asst.-Master, City Technical and Day Schools, Oxford.

Collins, Charles Edwin. Lincoln. ? † before taking a degree.

Bott, Arthur Everard Hulton. Ex. Jesus, II Chem. 1903. Asst.-Master Warwick School, 1904–6. Priest-in-ch. Colchester, Alta, 1909. Curate, Upton-on-Severn, 1911–.

Buck, Henry Charles. Non-Collegiate, III Chem. 1903. Schoolmaster.

Moore, Claude. St. Mary Hall, B.A.; Head Master of the Boys' Central School, Oxford.

Seys, Roger C. Magdalen College School, Army Candidate. Lieut. Royal Garrison Artillery, 1905.

Seys, G. William. Magdalen College School, Army Candidate.

Mockridge, Albert James. Hon. M.A. 1908. Head Master of School for Pupil Teachers, Oxford, 1900–8; Head Master Poole Secondary School.

Loxley, Frederick Lionel Keith, of Oxford; Pharmaceutical Chemist. M.P.S.

Monier-Williams, Gordon Wickham. University, I Chem. 1903.

Marshall, Reginald Philip. Keble, III Chem. 1901; Asst.-Master, Royal Naval College, Osborne, 1905.

Scott, John Irwin. Ex. Merton, I Chem. 1901. F.C.S. At Leipzig, 1901–2; Head Master, Grammar School, Kettering.

Cooke, Henry Harwood. New College, II Chem. 1901; Asst.-Master, Fettes, 1903.

Mortimer, Alfred. Ex. Exeter, Chem. 1904; F.C.S. Asst.-Master, Letchworth School, 1912.

1901.

Thomas, William Jones. Jesus, III Chem. 1902; 2nd Master, Pocklington, E. Yorks, 1906.

John, William Alfred. S. Jesus, II Chem. 1904. Chemist to a mine in S. Wales.

Cocks, Reginald Henry. Lincoln, II Chem. 1903; F.C.S. Science Master, Grammar School, Kingston-on-Thames; Head of Chemical Department, Technical Institute, Kingston-on-Thames.

Graham, Richard Percival Devereux. Non-Collegiate, II Chem. (distinction in Mineralogy), 1904. Lab. asst. to Prof. of Mineralogy, Oxford, 1903; Asst.-Professor of Mineralogy, McGill University, Montreal.

Beards, Clifford. ℌ. Jesus, II Physiol. 1904. Charing Cross Hosp. M.B. 1907; M.R.C.P. 1909. Medical Superintendent City Hosp. Birmingham.

The Stokes-Adams Phenomena. *B. M. J.* 1907.
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Morris, Joseph. Non-Collegiate, II Chem. 1903. Science Master, Hawarden County School, 1903.

Coles, Alfred Bertram. Non-Collegiate, II Chem. 1904. Sen. Science Master, Tottenham County School, 1907.

James, Garnet Williams. Jesus, II Chem. 1904. At Metallurgy School, Birmingham. Now in Canada.

Taylor, Reginald Lionel. Hertford, III Phys. 1903; B.Sc. Lond. Asst.-Master, Alleyn's School, Dulwich.

Lambourne, Christopher. Non-Collegiate, III Chem. 1904. Asst.-Master, Municipal Secondary School, Cardiff.

1902.

Bentley, Walter Henry. Ex. Merton, II Chem. 1902. Sen. Science Master, Borough Secondary School, Croydon.

Sadler, Ralph Trego. Non-Collegiate, Shute ℌ. 1901, III Chem. 1904. In Orders. Incumbent of Battle Harbour, Newfield, 1912; curate of Fort George, B.C. 1914.

Starley, Bertram Allan. Wadham, matric. 1899; M.A. 1906. Asst.-Master, Leighton Hall School, Carnforth, Lancs.

Stote-Fox, Robert. Hertford, IV Chem. 1903.

Adlam, George Henry Joseph. Wadham, I Chem. 1905; City of London School.

The constancy of water of crystallization in hydrated salts. [With H. B. Baker.] *J. C. S.* 1911.

Scott, Robert Watson. Non-Collegiate, Leathersellers' Ex. 1902; III Chem. 1905. Schoolmaster, in Colonies.

Farrands, Harry. Non-Collegiate, II Chem. 1905. Borough Road Training College.

Wright, Thomas Josiah. Non-Collegiate, matric. 1900. B.A.

1903.

Evans, Charles Irwin. St. John's, III Chem. 1903. Head Master, Leighton Park School, Reading, 1910.

Scothern, Albert Edward. Non-Collegiate, III Chem. 1906. Asst.-Master, Bedales, Petersfield, 1909; Association Blue, 1903–5.

Swallow, Luther James. Ex. Lincoln. III Chem. 1905. Barrister in Manchester.

Japp, Darsie Napier. St. John's, matric. 1901.

Benson-Baker, William Henry. University, III Chem. 1906.

Moss, Albert Henry. Non-Collegiate, matric. 1902. B.A. 1906.

Ford, Leonard Talman. Postmaster of Merton, I Chem. 1903.

Micklewright, Harry George Fletcher. Postmaster of Merton, I Chem. 1903. Science Master, Whitgift Grammar School, Croydon, 1904.

Lambert, Bertram. Ex. Merton, I Chem. 1903; University Demonstrator in Chemistry.

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Simpson, James Charles. Non-Collegiate, matric. 1902. B.A.

Thomas, Robert Edward. Non-Collegiate, II Chem. 1904. Curate of St. John's, Putney, S.W.

Hawtin, Herbert Edwin. Non-Collegiate, II Chem. 1904. Science Master, Berks. County School, Windsor, 1908.

Wheatley, William. Non-Collegiate, II Chem. 1907; F.C.S. Science Master, Preston Grammar School, 1907–9; Grammar School, Blackburn.

Trump, Richard John. Jesus, II Chem. 1905. Asst. in Patents Office.

Kenrick, Kenrick Lloyd. ℌ. Jesus, II Chem. 1905. Master at Wigan School.

Pinnock, Henry Tremayne. Exeter, I Chem. 1904.

Myles, Charles Derwentwater. Exeter, III Chem. 1904.

Bond, William Frederick. Exeter, III Chem. 1904. House Master, Lancing College. In Orders.

Batchelor, Tremlett Brewer. University, IV Physiol. 1907.

Pearson, Wilfrid John. University, III Chem. 1907.

Zacharias, George Jessel. ℌ. University, 1902.

Poulton, Edward Palmer. Brackenb. ℌ. Balliol, II Chem. '5. Son of Prof. Poulton, *Daub. Reg.*, p. 115. Treas. Gold Medal in Med. Guy's; M.B., B.Ch., M.A. 1910; M.R.C.S. '10; M.R.C.P. '11. Radcliffe Travelling ℱ.; Beit ℱ., 1914; Proposed research—Respiration and Metabolism in Disease.

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Hutchinson, William Doge. Balliol, II Chem. '6. Two years at Rothamsted Expt. Station. Botanical and Chemical work at Munich.

Birchenough, Charles. Balliol, II Chem. '5. Lecturer in Education and Master of Method, Sheffield University, 1909–.

History of Elementary Education in England and Wales, 1800–1913.
A Primer of Teaching Practice.

Middleton, Wilfrid Lawson. ℌ. Trinity, III Chem. '4.

Oldfield, Laurel Cecil Francis. Lincoln, II Chem. '6. Inner Temple. Capt. 12th Rifle Brigade. *Killed* in France, 25 Sept. 1915, aged 31.

The Law of Copyright.

Overy, Charles. Ex. Christ Church, II Chem. '5.

Pearson, Arthur Hearne. Queen's, IV Chem. '5. In business in Oxford.

Hadley, Felix Cyril Timmins. Queen's, matric. 1900. Capt. 8th Batt. R. Welsh Fus. *Wounded* in Dardanelles.

Newcomb, Clive. St. John's, II Chem. '5. M.R.C.S., L.R.C.P. '9; M.B., B.Ch. 1910. Casualty officer, St. Thomas's Hosp. Lieut. Indian Medical Service.

Crisp, George Hugh. Pembroke, M.A. '10; B.Sc. Lond. '9. Head Master, Oldbury School, 1911.

Sladden, Arthur Francis. S. Jesus, I Chem. '6; I Physiol. '8; M.B., B.Ch., M.A. '10; M.D. 1913. Open Schol. St. Barts.; Burrows and Skynner Prizeman, '10. Editor *St. Bart. Hosp. Journal.*

Medicine in Classical Africa. *St. Bart. Hosp. J.* 1912.

Odgers, Albert Garfield. S. Jesus, I Chem. '6. Master at Wyggeston School.

Blatchley, Charles Frederick Polwhele. Exeter, II Chem. '5.

Seal, Francis Joseph. St. John's, IV Chem. '4.

Coles, Alfred Bertram. Non-coll., II Chem. '4. F.C.S. Sen. Sci. Master, Tottenham County School, 1907.

Howell, William John. Non-coll., B.A. 1906.

1904 (Michaelmas).

Campbell, Norman Phillips. Brackenb. S. Balliol, I Chem, '7. In charge of Science Dept., Trinity College, Kandy (C.M.S.).

Solubility of Iodine in Water. [With Hartley.] *J. C. S.* 1908.
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Poole, Reginald Holiday. S. Trinity, I Chem. '7. Demonstrator at Balliol, 1907–8. Sci. Master, Bradfield Coll. 1909.

The Preparation of Conductivity Water. [With Hartley and Campbell.] *J. C. S.* 1908.

Glover, Norman. S. Trinity, I Chem. '5.

Gibson, Hugh Sumner. Trinity, III Chem. '6.

Kershaw, Henry Owen. Ex. Christ Church, II Chem. '6. Education Department, Government of India.

Johnston, George Douglas. S. Christ Church, I Chem. '6. Barrister-at-Law.

Nicholas, Sydney Diggary. Lincoln, IV Chem. '7. Asst. Master, Wheelwright Gr. School, Dewsbury, Yorks.

Hess, Arthur Frank. Lincoln, III Chem. '6.

Sykes, William Henry. Queen's, III Chem. '8. Asst. Commissioner, Northern Nigeria.

Birt, Roderick Harold Capper. New Coll. Member Cross-country Running Team, 1902–4. Priest's Orders, '8; F.C.S. Asst. Master at Radley.

Alexander, Thomas James Roland. Lincoln, I Chem. '7; Würzburg, 1909. Nobel's Research Lab., Ardrossan, 1914.

Clarke, Herbert Edmund. S. Jesus, II Chem. '7. Research Chemist in Lead Works, Newcastle.

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Clear, Thomas. Ex. Balliol, III Chem. '7. Dep.-Conservator of Forests, Madras, 1914.

Davison, Ronald Conway. Oriel, III Chem. '6.

Thomson, James Campbell. Jesus, II Chem. '7; B.Sc. 1912; Asst. to Dr. H. B. Baker, Ch. Ch.; Asst. Master at Charterhouse. Research with Lambert, q. v.

Vodden, Leonard. Jesus, II Chem. '7.

Nitrogen Chloride. [With Chapman.] *J. C. S.* 1909.

Bullock, Henry Aston Linton. ℌ. St. John's, B.A. '6.

McMinn, Hugh Bell. ℌ. St. John's, II Chem. '6. Railway Pupil on Midland Railway.

1905 (Michaelmas).

Mead, Lawrence. Balliol, IV Chem. '6. Barr.-at-Law M. T. '8; Captain's Cert., Cavalry School; Assoc. of Surveyors' Institute.

Editor of *Oke's 'Game Laws'*. 5th edit. 1912.

Barrett, William Henry. Balliol, I Chem. '8. Demonstrator at Balliol Lab. 1908–11; Sen. Sci. Master, Rossall, 1913–.

Wollaston: his Life and Work. *Trans. O.U. Jun. Sci. Club*, 1907.
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Dodson, Joseph Edward. Balliol, III Math. Mods.; II Chem. '7. Asst. Master at Liverpool College.

1906 (Michaelmas).

Whitley, Charles. Brackenb. ℌ. Balliol, III Chem. '9.

Merton, Thomas Ralph. Balliol, matric. '6; B.Sc. 1910.

Viscosity and Density of Caesium Nitrate Solutions. *J. C. S.* 1910.
The Absorption Spectra of Permanganates in certain Solvents. *J. C. S.* 1911.
On Changes in certain Absorption Spectra in Different Solvents. *Proc. Roy. Soc.* 1912.
Photography of Absorption Spectra. *J. C. S.* 1913.
Form of Extinction Curves: Cobalt Nitrate. *J. C. S.* 1913.
Absorption of Light by Uranous Chloride in Different Solvents. *J. C. S.* 1913.
Absorption of Gases by Copper. *J. C. S.* 1914.
On a Second Spectrum of Neon. *Proc. Roy. Soc.* 1914.

Guinness, Henry Samuel Howard. Balliol, III Zool. '9. Banker, Hamburg, 1910; Boston, U.S.A., 1911.

Beale, Arthur Hugh Lansdowne. Trinity, matric. '5.

Enfield, Ralph Roscoe. ℌ. Christ Church, II Chem. '8. Asst. to Prof. of Chemistry (Prof. Pope), Cambridge; Chemist to South London Metr. Gas Company.

Purnell-Edwards, John Purnell. Christ Church, IV Chem. '8.

Wright, Walter William. §. Pembroke, II Math. Mods.; IV Chem. '8. Math. Master, Municipal Sec. School, Ipswich, 1911.

Venner, Irwin Price. Jesus, II Chem. '8. Bowdon Coll. 1909–12; King's Sch., Grantham, 1914.

Boyd, Gardiner Cust. Lincoln, matric. '4. In Canada.

Boyd, Mossom de Grassi. Lincoln, matric. '4. In Canada.

Hookham, George Richard. Lincoln, matric. '5. Fruit-farming in British Columbia.

Machaya, Manapanda Muttanna. Jun. Indian Student. St. John's, III Geol. '8. Mysore Forest Department.

Ramaiengar, Bindignavale Venkatapathiengar. St. John's, B.A. '7. Mysore Forest Department.

Beaumont, George Ernest. §. Univ., I Physiol. '10; M.B., B.Ch. '10. Univ. Scholar, Middlesex Hosp. 1910; Theo. Williams Scholar in Pathology, '12.

Diabetes Mellitus. *Middlx. Hosp. J.* 1912.

Geekie, Bernard John. Magd. Coll. School. Dentist. L.D.S., R.C.S. 1911. Of 42 St. Giles's, Oxford.

Russell, John. Balliol, II Chem. '8; F.C.S. Science Master, Central Secondary School, Sheffield, 1908. Asst. Secretary to Education Committee for Oxfordshire, 1915.

Short Stories in *Pearson's Mag.*, *The Teacher*, and *Weekly Telegraph.*

Hutchinson, George Adrian. Balliol, II Chem. '8. † 1912.

Applebey, Malcolm Percival. §. Trinity, I Chem. '6; B.Sc. Fereday Fellow, St. John's. At Dept. of Explosives Supplies, Ministry of Munitions, 1915.

Chemistry of India Rubber. *Trans. O.U. Jun. Sci. Club.* 1906.

Some Physico-Chemical Properties of Mixtures of Pyridine and Water. [With Garrod-Thomas and Hartley.] *J. C. S.* 1908.

The Viscosity of Salt Solutions. *J. C. S.* 1910.

On the Boiling-Point of Water. [With the Earl of Berkeley.] *P. R. S.* 1911.

On the Boiling-Points of some Saturated Aqueous Solutions. [With ditto.] *P. R. S.* 1911.

The Latent Heat of Vapours; prelim. note. [With D. L. Chapman.] *Proc. Chem. Soc.* 1913.

Willson, Michael. Hunter Blair's Hall, III Chem. '7. In R. C. Orders. Master at Ampleforth College, Malton, Yorks.

King, Cuthbert Witham. Jesus, III Chem. '8. ? at Sec. School, Stockton-on-Tees.

Mason, John Milton. Jesus, matric. '4. No degree.

Reynish, James Bruce. St. John's, II Chem. '8; B.Sc. Lond. Oxf. City Technical Sch.; Gresham's Sch., Holt, 1908–10; Junior Insp. Board of Education, 1910–

Freeborn, Ernest Walter. ℭ. Univ., I Math. Mods. 1895; II Math. 1897. Asst. Master, Harrow.

1906.

Featherstone, Charles Richmond. Lincoln, II Chem. '8. Sen. Sci. Master, K. Edward Gr. School, Aston, Birmingham, 1912–

Garrod-Thomas, Richard Noel. Brackenb. ℭ. Balliol, I Chem. '6; S.M. Harvard, '8; Demonstrator, Balliol Lab. 1906–7; Tutor and Lect. Balliol. 1908–10. Barrister, Inner Temple, 1911.

The Solubility of Triphenylmethane in Organic Liquids with which it forms Crystalline Compounds. [With Hartley.] *J. C. S.* 1906.

The Solubility of Triphenylmethane in Organic Liquids with which it forms Crystalline Compounds. [With Applebey and Hartley.] *J. C. S.* 1908.

Fletcher, Robert James. Queen's, III Chem. '8. Late Asst. Master at Felsted School, Essex.

Robinson, John Hildred. New, IV Chem. '6; M.A.; Priest, '10; Curate of St. Matthew, Westminster, 1909–13; Pr. in charge of Cromarty, Ross-shire, 1913–

Robertson, Philip Wilfred. Rhodes ℭ. Trinity, I Chem. '7. Prof. of Chemistry, Rangoon; Lect. Imperial College of Science.

Rahman, Mohammed Aminar. Jesus, matric. , and only resided for a very short time.

1907.

Pickford, Percival. ☯. Lincoln, II Chem. '10. Studied at Freiburg i. B.; Sci. Master and Organist, Magd. Coll. Sch., Brackley. Lieut. 4th Batt. Oxf. and Bucks. L. I.

Morris, Arthur Vyvyan. New Coll., IV Chem. '8. Master, Charterhouse.

Carrington, Arthur John Bodman. Univ., IV Chem. '8; M.A. '13. Director of Roughway Paper Mills.

Wheatley, William. Non-coll. Sci. Master at Blackburn Grammar School.

Meadon, Percival Edward. St. John's, IV Chem. '9. Asst. Secretary to Education Committee for Oxfordshire; ditto for Essex, 1915.

Atkin, Robert. Jesus, III Chem. '9; B.Sc. '11. Sci. Master, Southwell Gr. School, 1910.

Wishart, George Illtyd. ☯. Jesus, III Chem. '9; F.C.S. Master at Alte Burg, Hanover, 1909; Eltham Coll. 1910; Queen's Sch., Basingstoke, '11; Cadet School H.M.S. *Conway*, 1913.

Jones, Herbert Edwin. ☯. Jesus, II Chem. '9; B.Sc. Lect. Agricultural Chemistry, Bangor.

The Homogeneous Decomposition of Ozone in the Presence of Oxygen and other Gases. *J. C. S.* 1910.
Decomposition of Dry Ozone. [With Chapman.] *J. C. S.* 1911.

Wills, James Taylor. St. Edmund Hall, II Chem. '8. Asst. Master, Sunderland Bede Collegiate School, 1909.

Phoenix, Alfred Douglas. Jesus, III Chem. '9. ? In Canada.

1907 (Michaelmas).

Wilson, Cyril Charles. Worcester, M.A. 1911. Curate of Sandown, 1911–13; of Ch. Ch., Woking, 1913–.

Ford, Reginald James. Queen's, IV Chem. '9. Sci. Master, St. Bees School, Cumberland. Capt. 17th Batt. Manchester Regt.

Burrell, Charles Milwyn. Univ., III Physiol. '11. Welsh Memorial Prize, 1910. Lond. Hospital.

Sothers, Donald Bevan. Ꞩ. St. John's, II Chem. '9. India Forest Service, at Dhulia.

The Solution and Precipitation of Iron, in Iron Pans. [With C. E. T. Morison.] *Jour. Agr. Sci.* vi, Pt. 1, p. 84.

Breakspear, Henry Shaw. Ꞩx. St. John's, III Chem. '9; F.C.S. Second Master, Ludlow Grammar School, 1909.

Mason, Frederick Alfred. Ꞩ. and Senior Ꞩ. St. John's, I Chem. '9; Ph.D. Munich. Demonstrator Imperial College of Science, London, 1914.

Halogen Derivatives of Malonanilide, Ethyl Maloanilate, and Malonanilic Acid. [With Chattaway.] *J. C. S.* 1910.

Ueber den Einfluss des Lösungsmittels auf Reaktionsgeschwindigkeit und Gleichgewicht. Munich, 1912.

Rose, Ernest Dudley. St. John's, matric. '5.

Fisher, Ernest Arthur. Balliol, I Chem. '11. Lecturer on Agricultural Chemistry, 1911–13, Chief Assist. in Chemical Research Dept. 1913, Wye Agricultural College, Kent.

Doyne, Humphrey Cathair. Trinity, III Chem. '10.

Cumming, Charles Linnaeus. Trinity, I Chem. '10. Research Fellow for Geology in Graduate College, Princeton University.

Rivett, Albert Cherbury David. Rhodes Ꞩ. Lincoln, I Chem. '9; B.Sc. '12. Lecturer Melbourne Univ., Organizing Sec. British Assoc., Australia, 1914.

The Rate of Reaction of the Triphenylmethane Dyes with Acid and Alkali. Part III. Diaminotriphenylcarbinol. [With Sidgwick.] *J. C. S.* 1909.

The Rate of Hydration of Acetic Anhydride. [With Sidgwick.] *J. C. S.* 1910.

The Rate of Hydration of Acid Anhydrides; Succinic, Methylsuccinic, Itaconic, Maleic, Citraconic, and Phthalic. [With Sidgwick.] *J. C. S.* 1910.

The Conductivity and Dissociation of Diacetyltartaric Acid. [With Miss Stella Deakin, Univ. of Melbourne.] *J. C. S.* 1912.

Underhill, Lionel Kingsley. See p. 293.

The Interaction of Chlorine and Hydrogen. The Influence of Mass. [With D. L. Chapman.] *J. C. S.* 1913.

1908.

Lacaita, Francis Charles. Balliol, IV Chem. '10. 17th Lancers.

Shaw, William Bayliss. Wadham, II Chem. '9. In business at Walsall.

Salts of 3 : 5-Dinitroquinol. *J. C. S.* 1911.
Salts of the Dinitro-dihydroxy benzenes. *Proc. C. S.* 1911.

Hancock, Ernest. $\mathfrak{S}$. Lincoln, III Chem. '10. Solicitor.

Thompson, Arnold Bosanquet. New Coll., aegrot. Chem. '9. Working for F.I.C. qualification as Analyst in London.

Ballance, Alaric Charles. New Coll., III Chem. '9; M.B. 1914.

Swann, Ernest George. St. Edmund Hall.

Munro, Arthur MacDonald. St. John's, III Chem. '11. Master at Wem Grammar School, 1911–12; Science Master at Technical School, Wellington, New Zealand.

Boyd, Laurence Chadwick. Corpus, II Chem. '8.

Holliday, Skelton. Non-coll. and Jesus, III Chem. '11. Asst. Master, City Technical School, Oxford.

Furneaux, George Pomeroy. Shute $\mathfrak{E}x$. Non-coll., II Chem. '9. Sci. Master, Kingston Grammar School; Head Master of Hastings School of Science, 1915.

Khosla, Lal Chand. Non-coll. Junior Indian Student.

Lindsay, Thomas. $\mathfrak{S}$. Balliol, I Chem. '10. Engaged on the Insurance Commission.

Blackman, Berkeley. Rhodes $\mathfrak{S}$. Queen's, III Chem. '9. ? Teaching in U.S A.

Whitfield, Geoffrey Ernest. New Coll., IV Chem. '9. In a Photographic Plate Co.

Sim, Hermann Alexander Coysgarne. Exeter, B.A. '11. Lieut. 1st Batt. Scottish Rifles (Cameronians). *Wounded*, 1 Jan. 1915.

1908 (Michaelmas).

Wilsdon, Bernard Howell. Lincoln, II Chem. '11. Research with N. V. Sidgwick and Lord Berkeley. Prof. of Chemistry, Government College of Lahore.

The Conductivity and Viscosity of Aqueous Solutions of Anilin Hydrochloride at 25°. *J. C. S.* 1911.

The Solubility of Aniline in aqueous Solutions of its Hydrochloride. [With Pickford.] *J. C. S.* 1911.

Decomposition of Hydrazides and Hydrazones by Heat. [With C. L. Cumming and Chattaway.] *J. C. S.* 1911.

The Rate of Hydration of Acid Anhydrides: Acetic, Propionic, Butyric, and Benzoic. [With Sidgwick.] *J. C. S.* 1913.

Heald, Sydney Joseph. Lincoln, III Chem. '11. In Holy Orders.

Nelson, Thomas Sydney. Univ., II Physiol. '12. At the Front, 1915.

Poulton-Palmer, Ronald William. Ex. Balliol, II Engineering, '11. Capt. Internat. Rugby Team, 1914. Firm of Messrs. Huntley and Palmer, Reading. Lieut. R. Berks. *Killed in action*, 4 May, 1915.

Bourdillon, Robert Benedict. Balliol, I Chem. '12; Fellow and Praelector in Chemistry, University Coll. '13.

Theory of Indicators. *Trans. O.U. Jun. Sci. Club*, 1912.

The Neutral and Acid Oxalates of Potassium. [With Hartley, Drugman, and Vlieland.] *J. C. S.* 1913.

Vlieland, Charles Archibald. S. Balliol, I Chem. '11.

Research, *see* Bourdillon, R.

Hamlyn, George Anthony. S. Trinity, II Chem. '11.

Baxter, Robert Reginald. S. St. John's, III Chem. '12. In Laboratory of Burroughs Wellcome & Co.

The Action of Nitrogen Iodide on Methyl Ketones. [With W. D. Chattaway.] *J. C. S.* 1913.

Research on Derivation of Halogen substituted Sulphon-amides.

Derry, John. Newton Ex. St. John's, II Chem. '11. With the Synthetic Products Co.; Chemist to Hopkins and Williams.

The Velocity of Reaction between Potassium Chloroacetate and some Aliphatic Amines. [With Moore.] *J. C. S.* 1912.

Berlein, Charles Mauritz. New Coll., III Chem. '10. With Anglo-Burma Oil Co. Lieut. 5th Batt. Oxf. and Bucks. *Killed in action*, 1915.

Bourne, Robert Croft. New Coll., B.A. '11. Stroke of O.U. VIII, 19–. Reading for Bar.

Pery, Hon. Edmund Colquhoun. New Coll.

1909.

Bury, Charles Rugeley. Trinity, I Chem. '11; B.Sc.

Webb, George Ernest. Non-coll., IV Chem. '9. In a Siamese Government School, near Bangkok.

Dell, Reginald. Non-coll., IV Chem. '9. Science Master, Chigwell School, Essex.

1909 (Michaelmas).

Olmsted, James Montrose Duncan. Rhodes §. Queen's, III Chem. '11. Dep. Prof. Richmond College, Va., U.S.A.

The Action of Aromatic Amines on Ethyl Malonate. [With Chattaway.] *J. C. S.* 1910.

Lambert, William James. §. Queen's, I Chem. '12. Indian Forest Service.

Has prepared a thesis for the B.Sc. on Polymorphous modifications of Anilides and Hydrazides.

Haeffner, Wilfrid. New Coll., III Chem. '11. Engaged in Colour Works.

Parsons, Nigel Montgomerie. New Coll., III Chem. '11. Chemist with Messrs. Strange and Graham. (Synthetic Rubber.)

Swinton, Alan Edulf. New Coll., III Chem. '12. Interested in Agricultural Research.

Weather Forecasting. *Trans. O.U. Jun. Sci. Club.* 1912.
N-chloro-Derivatives of Benzylidene-Diamides. [With Chattaway.] *J. C. S.* 1912.

Cowie, Graham Robertson. Univ., III Physiol. '13. Welsh Memorial Prize, 1911. At Middlesex Hospital.

1910.

Vipan, Geoffrey. St. John's, IV Chem. '13,

Forrester, George Douglas. Univ., IV Physiol. '13. In business in Burmah.

Pierce, Harold Wynn. ℌ. Lincoln, III Chem. '12. *Died* in Uganda.

Tunbridge, William Stephen. Lincoln, IV Physiol. '12.

Gloyne, George Blakiston. Wadham, IV Chem. '11. With a trading company in Batavia, Java, 1914.

Manley, Cyril Hubert. Bracegirdle Ex. Non-coll., II Chem. '13. Son of J. J. Manley, *Daub. Reg.*, p. 130. Assistant to Oxford County Analyst, 1914–15. Works Chemist at Messrs. Chance and Hunt, Govt. Dep., Oldbury, near Birmingham. New works 1915.

Drury, Vyvyan Drue. *b.* 13 Feb. '93. Of Eton College until 1910. 2nd Lieut. County of London Yeomanry (T.F.). *Wounded*,

Aldridge, Montague. Shute Ex. Non-coll., III Chem. '12.

The Auto-reduction of Hydrazines. [With Chattaway.]
J. C. S. 1911.

Constable, Alfred Bertie. Non-coll., III Chem. '12; B.Sc. Assistant to Oxford County Analyst (W. Fisher), 1912–13. Science Master, Bromley, Kent.

Derivatives of P-iodo Aniline. [With Chattaway.]
Proc. Chem. Soc. 1913.

1910 (Michaelmas).

Hamilton, Charles Keith Johnstone. Lincoln, III Chem. '13. Medical Student.

Gillbert, John Guy. ℌ. Lincoln, II Chem. '12. Asst. to H. B. Baker. Chemist with Brunner, Mond & Co.

Coghlan, William Humphrey. Univ., matric. '9, †.

Tinne, Christopher Edward. Univ., III Chem. '14. 2nd Lieut. I.A. Reserve Brigade R.F.A.

Womersley, Leonard Dale. Univ., IV Chem. '13.

Osborne, Ernest Thomas. Radcliffe ℌ. Univ., II Chem. '13. Engaged in Research on Derivatives of Butyl Alcohol with Prof. Perkin.

Cory-Wright, Geoffrey. Univ., matric. '10.

Donald, Graham. Ex. Univ., IV Physiol. '14. Assistant Surgeon on a Torpedo-Boat, 1914.

Greenshields, William Rose. Univ., III Physiol. '14. Welsh Memorial Prize, 1913.

Greenwood, Maurice. Trin., II Chem. '12.

Downes, Villiers. Trin., matric. '09.

Scholfield, Wilfrid Stanley. Balliol, 1909–11. Now in British Columbia.

Johnston, Geoffrey Stewart. New Coll., IV Chem. '11. In business in S. America. Lieut. Essex Yeomanry. *Killed in action* in France, May 13, 1915.

Berisford, Edwin Aris. Holwell Ex. Queen's, II Chem. '13. Capt. 9th (Serv.) Batt. W. Yorks. Engaged in Research on Poison Gas, 1915.

Lucas, Gilbert William. Rhodes S. St. John's, III Chem. '13. Unfinished Research with Prof. Perkin on Alkaloids. ? Holding some post in S. African College.

Bomford, Alan Claud. St. John's, matric. '10, III Chem. '13.

Bassett-Smith, Dudley William. St. John's, IV Chem. '12. Schoolmaster.

Crane, Reginald Hooper. Ex. Keble, III Chem. '11; B.Sc. 1914.

1911 (Lent).

Kingstone, Wesley Herbert. Non-coll. and Pembroke, matric. '9.

Ainsworth, William Thomas Taylor. Shute Ex. Non-coll., IV Chem. '11. Post in Egypt.

Freeman, Alston Berkeley. St. John's, III Chem. '13.

Freeman, Tristram. St. John's, B.A. '14. 2nd Lieut. Worcestershire Regt. *Killed in action*, March 12, 1915.

Tesh, William. Queen's, II Chem. '13. Signalling Instructor. Flight Sub-Lieut. R. Naval Air Service, 1915.

Research on Isomeric Hydrazides [with Chattaway] (in progress).

Munro, Leslie Alexander. Somerset Ꞩ. B.N.C., III Chem. '13. Chemist with Brunner, Mond & Co.

Wyley, William Reginald FitzThomas. Balliol, matric. '10. 2nd Lieut. 3rd Batt. Argyll and Sutherland Highlanders.

1911 (Michaelmas).

Atkinson, Harold. . St. John's, II Chem. '14.

Thomas, Arthur Ernest. Ꞩ. Univ. '11.

Hunter, Hugh Michael. Univ., matric. '11. 2nd Lieut. 3rd Batt. Wilts. Regt. *Died of wounds* after Neuve-Chapelle, April 6, 1915.

Spurrell, William James. Ꞩ. Lincoln, 1911. 2nd Lieut. 9th (Service) Batt. Norfolk Regt.

Kewley, John Tasker. Ꞩ. B.N.C., II Chem. et Cryst.* (dist.) '14. 2nd Lieut. 6th (Service) Batt. Loyal N. Lancs. Regt.

Shardlow, John Ambrose. Keble, III Chem. '12.

Hodgkin, Adrian Eliot. Ꞩ. Keble, II Chem. '12. Chemist with Brunner, Mond & Co.

Facer, Albert William. Hughes Ꞩ. Oriel, II Chem. '14; O.T.C. Research with Prof. Perkin on action of Chlorine on Butylene.

Goolden, Richard Owen. Queen's, matric. '10. 2nd Lieut. 3rd Batt. Bedfords.

Stuart, John McArthur. Balliol. ? Research with Hartley.

1912 (Lent).

Walters, David John. B.N.C., II Chem. '14.

Flowers, Charles Reginald. Ꞩ. Lincoln, 1912. Interned in Austria, 1914.

Skinner, Douglas Hilton. Univ. 2nd Lieut. 7th (Service) Batt. R. W. Kent Regt.

Barnard, Eric. Univ., I Physiol. '14. 2nd Lieut. 7th (Service) Batt. Gloucestershire Regt.

Thompson, Morice Bell. St. John's. 2nd Lieut. 8th (Service) Batt. R. Berks. Regt.

Barley, Leslie John. Southampton Ex. Queen's, II Chem. '14. Capt. Dept.-Asst. Adj. Gen. Engaged in Research on Poison Gas, 1915.

Wise, Henry Dacres. Oriel, matric. '10.

Chari, Perungavur Raghava. Junior Indian Student. Non-coll., IV Chem. '13.

Gilson, Van Wagenen. Rhodes S. Queen's, '11.

Wright, Claude de Vire. Univ., matric. '10.

Tuke, Arthur Harrington Seymour. Univ., IV Physiol. '14. 2nd Lieut. 2nd Batt. Northumberland Fusiliers. † *in action*, May 9, 1915, near Ypres.

Wright, Samuel King. Lincoln, II Physiol. '14. Lieut. 8th Batt. W. Riding Regt. *Killed in action*, Dardanelles, 27 Aug. 1915.

Webster, Francis. New Coll., matric. '10.

Rosling, Alfred. St. John's. 2nd Lieut. Suffolk Yeomanry.

1912 (Michaelmas).

Shaw, Edward Alfred. B.N.C., matric. '11. 2nd Lieut. 6th (Service) Batt. Oxf. and Bucks. Lt. Inf.

Harris, Hinton John. Hastings Ex. Queen's. 2nd Lieut. 5th Batt. Hants Regt.

Bowlby, Hugh Salvin. Balliol, matric. '11. 2nd Lieut. 7th (Service) Batt. Royal Sussex Regt.

Godson, Claude Lionel. Trinity, matric. '11. 2nd Lieut. Infantry.

Tribe, Maurice Odell. St. John's. Serving.

Jerman, Reginald Herbert. St. John's. Lieut. 1st Batt. Royal Welsh Fusiliers (promoted from Motor Cyclist, R.E.).

Hirst, Thomas William. St. John's. 2nd Lieut. Yorks. Dragoons.

de Jongh, Louis Anthony. Univ., matric. '12.

Williams, Thomas Wodehouse. Oriel, matric. '12. 2nd Lieut. 3rd Batt. Northants Regt. *Killed in action*, May 1915

Davies, Thomas Ellis. S. Lincoln, 1912.

Aldous, Wilfrid Major. S. Lincoln, 1912. 4th Batt. Oxf. and Bucks. Lt. Inf.

Jarintzoff, Dimitri. Postmaster, Merton, II Chem. '13.

1913.

Potts, Henry. Radcliffe S. Univ. '13.

Booker, Hubert Gerald. St. John's.

Beard, Edmund Charles. B.N.C., matric. '12. 2nd Lieut. 5th (Service) Batt. Royal Irish Regt.

Willans, Peter William. Math. S. Hertford.

Ellington, Oscar Charles. Neale S. Oriel, '13.

Sharpe, Frank. Non-coll., matric. 1912.

1913 (Michaelmas).

Kendrick, Thomas Downing. Oriel, matric. '13. 2nd Lieut. City of Birmingham Batt. Royal Warwicks. Regt.

Barry, Arthur Gordon. Oriel, matric. '13. 2nd Lieut. New Army.

Colbourne, Maurice Dale. Ex. Oriel, '13. 2nd Lieut. 3rd Batt. Royal Berks. Regt.

Lawson, Digby Richard. S. Univ., matric. '13.

Maggs, Eric William Bristowe. Univ., matric. '13.

Loxton, Charles Edward Holden. Univ., matric. '11. 2nd Lieut. 5th Batt. N. Staffs. Regt.

Harold, John Peter Bevan. Univ., matric. '12. 2nd Lieut. R.F.A.

Clapperton, Robert Henderson. Univ., matric. '12. 2nd Lieut. 5th Batt. Devons. Regt.

Hodgson, George Dufour. Hastings Ex. Queen's, '13.

Hathaway, Thomas William. Non-coll., matric. '12.

Taylor, Thomas Weston Johns. S. B.N.C. '13. Public Schools Batt. Middlx. Regt.

Bown, Arthur Mervyn. Millard S. Trin., matric. '12. 2nd Lieut. 7th London Brigade, R.F.A.

Stephens, Frederick Dorsey. Rhodes S. St. John's.

Powell, Robert Keal. St. John's. 2nd Lieut. 11th (Service) Batt. N. Staffs. Regt.

1914.

McCance, Henry Bristow. Jodrell S. Queen's.

Sinclair, Thomas Spark. B.N.C., matric. '11.

Ferard, Cecil Leonard. Univ., matric. '13. King Edward's Horse.

Horsley, Siward Myles. St. John's. 28th Batt. London Regt. (Artists' Rifles).

Vines, H. W. C., son of Prof. S. H. Vines. S. Christ's Coll. Cambridge, B.A. Camb. '14.

Christison, Frederick John. Univ., matric. '13. 2nd Lieut. 10th (Service) Batt. Argyll and Suth. Highlanders.

Donne, Arthur Courtenay. Univ., matric. '12. 28th Batt. London Regt. (Artists' Rifles).

White, Reginald Strelley Moresby. Heath Harrison Ex. B.N.C., '12. 2nd Lieut. 8th (Service) Batt. Leicestershire Regt.

Sutcliffe, Ronald. Bracegirdle Ex. Non-coll., matric. 1913. Earl of Durham's Battalion.

1914 (Michaelmas).

Panday, Piroshaw. Lincoln, matric. '13.
Collins, Oliver Charles. Ex. Lincoln, '14.
Stansbie, Edward Hounslow. S. Lincoln, '14.
Shepperd, Charles Bertram. Queen's, matric. '14.
Cowan, John Macqueen. Univ., matric. '14.
Sherrington, Charles Ely Rose, son of Prof. Sherrington, Fellow. Shrewsbury School. 2nd Lieut. 3rd–4th Batt. Oxford and Bucks L.I.

1915.

Alden, John Wenham. Worcester.
Boone, William Brooke. Lincoln.
Codd, Laurence William. Univ.
Wace, Henry. King's School, Canterbury.
Harrison, John Malthouse. Hon. S. Queen's.

Hoskings, Arthur Austin. Keble.
Drescher, Hugh Albert Edward. Ex. Queen's.
Hardy, John King, son of W. B. Hardy, F.R.S.
Johnston, James W.
Purdy, James Knowles. Lincoln.
Dixon, Percy Embleton. Queen's.
Leggatt, Donald Hugh Murray. Charterhouse School. Preparation for Woolwich.

1916.

Thomas, Moyer Delwyn. R. Lincoln.
Carleton, Harry M. New College. (Zoology.)

List of Boys from Magdalen College School who have attended Mr. Manley's Courses in the Daubeny Laboratory.

1907.

Sells, Clement Peronnet. Ex. Merton, III Physiol. '12.

Underhill, Lionel Kingsley. Ex. Jesus, II Chem. '11. In a Missionary School in China.

Page, George Foster Braithwaite. M.B., B.Ch. Edinburgh. Royal Navy.

Pilcher, Keith Ritchie. S. Univ., II Chem. '13. Science Master, Kingston Grammar School, Jamaica.

Manley, C. H. See p. 286.

Cooke, Clement. Arts S. St. Thomas's Hospital.

Palin, Alan C. S.

1909.

McIntyre, Kenneth.

Canton, Herbert W.

Thomson, Graham G. Passed Interm. Sci. Exam. London, 1913.

Grundy, G. Leslie O. With Vickers, Maxim & Co. 2nd Lieut. Yorks. and Lancs. Regt.

Clapperton, Robert Henderson. Univ. Coll., matric. '12.

1910.

Drew, Arnold. 2nd Lieut.

Bell, Hugh Chester. Jesus, matric. '13. 2nd Lieut. Kitchener's Army.

Gwilliam, Stephen.
Morgan, B. E.
Wilkinson, Frank D. In a London office.

1911.

Hoey, John Trevor Stevenson. Jesus, matric. '11. R.A.M.C.
Clarke-Turner, Frank. Sidney Sussex, Camb., matric. '12.
Christie, Robert C. Royal Engineers.
Bradley, Horace F. In Canada.

1912.

Boyer, George Walker Basil. Adm. at Downing, Camb. Schoolmaster at Skegness.
Robertson, William Parret. Wadham.
Simmonds, Gerald. In Eastern Telegraph Co.'s service.
Attwood, Carden. Science student in London.
Scattergood, Thomas Anthony. St. John's, matric. '13. R.A.M.C.
Bickerton, Gerald T. F. Engineering. Hants Regt. Cycle Corps.

1913.

Rolls, Charles W. Schoolmaster.
Amon, Horace. In London, County, and Westminster Bank.
Martin, Geoffrey N. In a London office.
Shepperd, Charles Bertram. Queen's, matric. '14.

1914.

Beasley, Bernard Radbone. Passed into Civil Service (Intermediate).
Burt, Henry J. American citizen.
Abu Bakar Bin Ibrahim, Prince.
Jacks, Graham.
Slater, Owen Richard.
Read, Hugh Stanley Hely.

1915.

Ahamed, Bin Ibrahim.
Deglatigny, Pierre Octave Médéric.

List of Belgian Boys admitted to Lectures during the German occupation of Belgium.

1915.

With Monsieur **Locus** :

Cundde, Marcel. Antwerp.
Dufraing, Léon. Antwerp.
Claeys, Gaston. Ghent.
Hertoghe, Pieter. Antwerp.
Liesens, Antoine. Ramines.
Steenhout, Fernand. Ghent.
De Smet, M. Bruxelles.
Belpaire, André. Antwerp.
Thoné, Albert. Haelen (Diest).
Van Meerbeeck, Maurice. Malines (Antwerp).

1916.

Devaux, Maurice. Antwerp.
De Jonghe, Jules. Haasdonk.
Dufraing, Charles. Antwerp.
Lyssens, Léon. Thisselt.
Liesens, Michel. Ramines.
Thoné, Léon. Haelen (Diest).

List of recently printed works relating to Magdalen College.

A History of the Daubeny Laboratory. With portrait of Dr. Daubeny and two plates. 8vo. 5*s*.

(*A few copies were issued with some Additional Papers, or reprints of scientific reports, bound at the end of the volume.*)

Oxford Gardens, based upon Daubeny's Popular Guide to the Physick Garden of Oxford: with notes on the Gardens of the Colleges and on the University Park. Price 6*s*.

A Register of the Members of St. Mary Magdalen College, Oxford. New Series. Fellows. In 8 volumes. By W. D. Macray. Price £2 10*s*.

A Description of the Brasses and other Funeral Monuments in the Chapel of Magdalen College. With 17 illustrations. Price 2*s*. 6*d*.

(The above-mentioned books can be obtained on application at the *Bursary*, *Magdalen College*, or at the *Daubeny Laboratory*, *Magdalen College*, *Oxford*.)

A Cartulary of the Hospital of St. John the Baptist. Vols. I and II, price 10*s*. 6*d*. each. Vol. III in preparation. Published by Humphrey Milford, Oxford University Press.

The Daubeny Laboratory Register 1916—1923

With notes on Scientific Researches carried out by Members of Magdalen College, Oxford

By R. T. Gunther

Vol. III

The Bird of Time has but a little way
To flutter—and the Bird is on the Wing

Printed for the Subscribers
At the University Press, Oxford
1924

To be obtained at the Laboratory, Magdalen College, Oxford. Price 10*s.* 6*d.*

PREFACE

'Can Physical Science obtain a home in an English University?'

THIS question was propounded by Professor Daubeny in the middle of the nineteenth century after thirty years of work. For years it had remained uncertain whether the scientific superstructure planned by himself and his friends could stand on Oxford clay. But, based on his four subjects, Chemistry and Geology, Botany and Rural Economy, the edifice stands four-square in the University to-day, secure as the pyramid of Cheops. That no Oxford Professor would deem it needful to lecture on such a theme now, is due to the foundations well and truly laid by Daubeny.

When, twenty years ago, we produced the first volume of the origin and History of Daubeny's principal benefaction to his College, there were some persons still living who remembered him and his lectures. A second volume, pushed out during the stress of the War, gave an opportunity of rendering account of the successes of the pupils of Hopkins, Chapman, Yule and others, and of emphasizing the importance of Research as the one and only good training for men of science of the first rank. This third and last volume includes Reports on work accomplished during and after the War; lists of students and special researches; notes on peculiar advantages enjoyed by Magdalen men in the past; and regrets that members of the College are no longer permitted to make full scientific use of the collections which Daubeny bequeathed in Trust for their benefit, or of the Building which he erected at his own expense for that purpose. Researches that had been advanced in his Building to near the point of completion,

and had been directed by a College Order of 1920 to be continued, were made impossible in 1923 as the space necessary for their prosecution was commandeered by a new Order in that year.

The Tables of Classes in the Schools printed in the second volume have not been brought up to date, but we are confident that the increase in the annual number of Natural Science Demyships voted by the College to make good War-losses has been amply justified, for in the past year our science men broke all records by obtaining seven First Classes in the Schools. Magdalen science men have been winning Fellowships at an average rate of one in every five years, but at Colleges *other* than their own; and they have been gaining Professorships even more rapidly, but at *other* Universities. In Natural Science Oxford Boards of Electors usually prefer Cambridge men for Oxford posts.

Daubeny's pupils and grand-pupils have spread his scientific teaching to the ends of the Earth, whence it has returned to grow with vigour in his native land—but the home that he built and endowed for it has now been closed to them.

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THE DAUBENY LABORATORY REGISTER

DR. DAUBENY, HIS BUILDING, AND HIS WILL

The South Wall.

Since the appearance of the first volume of this History, twenty years ago, further facts relating to the site of the Daubeny Laboratory have come to light. This is chiefly due to the increased facilities of access to the University Archives afforded by Mr. Poole since he has held the Keepership. In one document certain details relating to the enclosing of the Botanic Garden by a wall are set out at length. The original obligations laid upon the masons are still of interest to us, because this same wall, finished in 1633, serves as the south wall of the Laboratory, and carries much of the superstructure. It is satisfactory to read that the wall was to be built 'well fair and sufficient as well as Al soules Colledge walls, Magdelen Colledge Tower, or any the fairest buildings of that kind in Oxford both for truth and beauty'.

The year, too, of the picturesque opening ceremony at which Mr. Edward Dawson, a physician of Broadgates, spoke his eloquent oration, has been variously given as 1622 and 1632; it should be 1621.

The College Wurkehouse.

There is no evidence that, during the first three centuries of the existence of the College, there had been any permanent repository for scientific apparatus and materials, other than the Library. In the Accounts for 1531 there is a note that 'le wurkehowse' was repaired; but that may have been a carpenter's shop, or even a tool-shed in the orchard or gardens. Dr. Charles Daubeny was the first member of the College who both realized the need, and had the means and the public spirit to build at his own expense and to endow a Scientific Institution in connexion with the College. And we who have worked

within his building and have benefited by his endowment, may well be proud of its Founder, a man whose work included the foundation of the British Association for the Advancement of Science.

Dr. Daubeny.

It is just a hundred and one years ago since our benefactor, Dr. Daubeny, was appointed Aldrichian Professor of Chemistry in Oxford. He was one of the most efficient Professors of Chemistry that Oxford has ever produced: he wrote, he researched, and he taught. At least a thousand members of the University attended his Courses; at least another thousand have directly benefited by his endowments for Science since his death. His scientific work and interests were planned on so comprehensive a scale that the number of his disciples beyond the academic circle could hardly be counted. He was a son of Winchester and Magdalen, and Oxford should hold him in honour.

Physically, he was small in stature, and, if it be fair to judge from pictures and photographs, undistinguished in appearance. His classical colleagues were pleased to make fun of him: their Common Room stories have frequently appeared in print, but Daubeny had a great fund of humour, and was not behindhand in enjoying them. The following relate to the early period when the University Chemical Laboratory was in the vaults under the Ashmolean Museum.

His Ashmolean Lectures.

'Dear Daubeny was Professor of Chemistry. I used to go now and then to his Lectures, which were very valuable, with occasional mishaps.

'One time we were all warned to go off to the other end of the Lecture Room, because he and his old man [John Harris] were going in some way difficult to understand to compound two gases out of two pots at the end of two long sticks. Away we went. The sticks converged, and we prepared for the issue. There was no issue and we came back.

'Another day came "laughing gas". Circle formed—I was one—victim in the middle. Having received the gas he began making dreadful faces. He came opposite me in turning all about, and I laughed in his face. He became mad, and rushed at me to punish or destroy me. I turned, jumped over a

table, breaking two large Cylinders, and never stopped till I was in my rooms in Oriel and had locked the door. This was my last visit to the Chemistry Lecture.'

George A. Denison who contributed these reminiscences to *Our Memories* printed by Provost Daniel of Worcester College, attended the Chemical Lectures in 1826. In view of the fact that one of his fellow auditors became President of the Royal Society, and he himself became Archdeacon of Taunton, it may be that the lectures were not as ill-suited to the audience as he would have us believe.

'Daubeny, though a good lecturer in chemistry, was a bad manipulator, and his experiments often went wrong, and did not fulfil his predictions. He would pour two colourless liquids together, affirming that they would become green, when lo! the product was a bright scarlet, and dip a lighted match into an apparently empty jar, saying it would be extinguished, but a violent explosion would shatter the jar and frighten his audience.' This second quotation is taken from R. W. Browne in *Our Memories*, and yet a third impression may be derived from the following passage from Henry Kingsley's *Ravenshoe*, ch. lxii.

'He lay here one day when the doctors came down from London. And one of them put a handkerchief over his face which smelt of chemical experiments and somehow reminded him of Dr. Daubeny.'

A contemporary poem indicates that the chemistry lectures did exercise a special influence on the mental development of those who attended them.

> Yet where, oh! where is here th' inventive fire
> That rais'd the arts which framed the scenic choir—
> The daring mind, that grasp'd the etherial prize,
> Rais'd men to gods, and climb'd the spangled skies—
>
> . . . . . .
>
> All that applies philosophy to life—
> The firm resolve that calms the passion's strife
> The practice moulded in the die of thought
> What Cato did—what Epictetus taught?
>
> . . . . . .

Do no such ranks
As grac'd Ilyssus lurk on Isis' banks,
Wait but to see the barriers dash'd away,
And pant impatient at the long delay?
Ev'n now, where Daubeny plies with modest skill
The fine alembic, and the chymic still,
See ardent crowds pursue the magic sport,
Mix the bright dies, or charge the curv'd retort.

Oxford in 1834. Part 2 *The Intellectual System,* 1834.

But 'little Dubs', as he was called, was appreciated by the majority of his contemporaries. William Morgan, for instance, writing to Bloxam, said, 'It must be a pleasure to you to give an account of Daubeny's career. You cannot speak too highly of him; he was indeed an ornament to his College, which may be justly proud of him. I think his character was perfect, at once so talented and so amiable, one of the most modest, purest minds that ever existed.' 'It will require all your skill to enumerate the virtues of this most excellent man.'

Dr. Daubeny's Will.

As to the piety of his character the preamble to his Will is also worth remembering. It sets forth his lifelong love for his College; it suggests that it is not wise for those who come after him lightly to set aside his prescriptions for the benefit of its members.

'This is the last Will and Testament of me Charles Giles Bridle Daubeny, Doctor of Medicine, Professor of Botany, etc., in the University of Oxford. I desire to be buried in the Cloisters of Magdalen College not wishing to be separated in death from a Society with which I have been connected during the greater part of my life and to which I am so deeply indebted not only for the kind countenance and support ever afforded me but also for supplying me with the means of indulging in a career of life at once the most congenial to my tastes and the best calculated to render me an useful member of the Community, although at the same time I am fully sensible of sundry omissions of duty and neglect of the means of Spiritual improvement for which I can only look to pardon from the merits of a merciful Redeemer.'

In discussing any points that will arise from time to time as to the use that is to be made of his Building, the fundamental document bearing upon the case is his Will, which established a Trust that has been consistently administered until recently by the College through its qualified officers.

But it is also pertinent to the discussion to consider the conditions obtaining when he made this Will, for these, too, would have largely determined the form in which he defined his intention.

Waynflete's Regulations as to use of Library.

The College was under its Old Statutes. These contain no reference to Museums or Laboratories, but the regulations for the use of a similar institution, the Library, are very explicit.

'Our pleasure is, that every Fellow and Scholar of our said College have free access to the common Library of the same; and that every one of the same have his own key of the door-lock of the same Library, by means of which he may freely enter and go out.' (William of Waynflete's *Statutes*, 1480–2.) Waynflete had also ruled that 'in case of any last Will to be made in favour of the said College, such Will or Disposition of the Donor in this present case [of books] be in all things observed, notwithstanding our Statute'.

This would have been the Law on which Daubeny would have relied, when disposing of his own property.

During his lifetime he gave to the College the Laboratory Building, that he had been allowed to erect to house his extensive library and scientific collections, as well as for scientific lectures and teaching; and he presented an equatorial telescope in 1855.

Daubeny's Beneficiaries.

He also—and this is most important—encouraged certain privileged members of Magdalen College to use his collections in his New Building. These persons he defined as 'Fellows of the Society and Members who hold Demyships in Natural Science'. The inference is obvious. Demies in Natural Science were to have a privilege that other Demies were not to have; and while granting the same privilege to all Fellows, for politic reasons, he knew it to be probable that only those few who were interested in Science would take advantage of his collections. In after years this desire was given full effect by

the College when they placed the Building under the control of a Senior Science Tutor.

In 1861 a Catalogue of his Collections was printed. Thirty-five pages are devoted to Mineral and Geological specimens, with references to printed descriptions in books on his shelves: eleven pages are devoted to his physical and chemical apparatus, also with references to geological specimens. There is no doubt that his interest in the compilation was mainly geological.

In the two previous volumes, and again in the title to this book, the name 'Daubeny Laboratory' has been used. It is regrettable, because this term has misled many as to the real use of the Building. Daubeny himself did not use the name except for a single room: he spoke of the 'Building', or of the 'New Buildings, contiguous to the Botanic Gardens'. But the mistake is excusable, because the name had been used by predecessors and in the official records of the College. It should now be emphasized that Daubeny did not regard a chemical laboratory as the exclusive, or even as the most important use to which his building might be put, and this is made clear by the first objects which he mentions in his Will, which must be regarded as property of especial value in his estimation.

Bequest of Minerals, etc.

'I give and bequeath to the President and Scholars of Magdalen College absolutely all my minerals and geological specimens, and the philosophical apparatus in the New Buildings erected by me in the year 1848, opposite to Magdalen College, on ground belonging to the said College, together with the printed books on chemical and scientific subjects, and also the best of my microscopes and all its appliances, and also my chemical diagrams. . . . The scientific books will find an appropriate place in one or both of the two rooms over the Laboratory, which were occupied by Mr. Masters, and which after my death will be the property of the College.'

And his library of books was certainly not one that anybody would desire to see in a chemical laboratory.

By the term 'scientific books' he meant principally physical and geological works, but not botanical books, for they are dealt with in another clause, and are bequeathed to the Chan-

cellor, Masters, and Scholars of the University of Oxford in trust for the use and benefit of the Professor of Botany and his successors for ever. It may be argued that by this bequest, in addition to the many valuable gifts he had already made to the Botanic Gardens during his lifetime, and to the £200 that he bequeathed to the Gardener, and the pension of £10 to one of the employees at the Gardens, he considered that the Botanists' expectations from him, as their late Professor of Botany, had been fully satisfied. All his other resources—building, collections, and books—were to be mainly devoted to scientific studies, other than Botany: indeed, he classified his books as 'Medical, Classical, Scientific, or Botanical', implying that he was limiting the meaning of the term 'scientific'. Of the 'scientific' objects, geological specimens, as we have said, formed, and still form, by far the most important part of his collections.

The Daubeny Trust.

So far, there was nothing to prevent the College dealing with a free hand with both building and collections, but this contingency was, as many might think effectively, guarded against by the establishment of a Trust. A Fund was bequeathed, which was accepted by the College, and still figures in the College Accounts. This Trust has been conscientiously administered from 1868 until 1923.

'And I give to the said President and Scholars £1,000, three per cent. stock, in Trust to pay the dividends or annual produce thereof as a salary to some person to be appointed as Curator by the President for the time being, during good behaviour, to take care of the aforesaid specimens and apparatus. . . . And considering that the value of the Collections, which I give to the College including scientific books, philosophical instruments, specimens of chemical products, rocks and minerals, must have cost me considerably more than £3,000, I trust that the College will adopt such measures as may be necessary to prevent them falling into decay, for which purpose I have left the interest of £1,000 stock to a Curator as aforesaid, that he may be responsible for the integrity of the Collections, and render them as useful as possible for the purposes of instruction.'

The intention of the Trust is clear:

1. The Collections are not to be dispersed, nor are specimens to be destroyed.

2. 'Instruction' has been taken to include the instruction of Fellows and Natural Science Demies. It is doubtful whether the testator intended the instruction of a wider circle of persons, but if so it would have been only in charge of Fellows or Demies of the College. And again, the subjects of the instruction would have been principally Geology, Chemistry and Physics, the subjects for which he left books and specimens to the College, but not Botany.

3. The acceptance of the Trust implied the provision of necessary house-room in the Daubeny Building, or elsewhere, both for the collections and for persons who have a right under the Trust to work at them. While the Daubeny Building is standing, and the Daubeny Collections and their Curator are housed in it, and while no other accommodation for them has been provided, it necessarily follows that the first use, to which the essential parts of that building should be put, is that contemplated by its builder.

An annual Visitation to examine into the state of his Collections was also prescribed by Dr. Daubeny, and the College endeavoured to give effect to this by their By-law 276, 'An annual inspection of the specimens and philosophical apparatus left by Dr. Daubeny to the College shall be made by the President and Vice-President.' But doubtless through the encroachment of University business upon the time of College officials, this excellent custom fell into desuetude. Had the means for printing an annual report for the College been forthcoming, the result would have been satisfactory; but it was obviously out of the question to devote fees paid by undergraduates for laboratory teaching to such a purpose.

The Daubeny Curator.

The character and status of the Curator is also carefully outlined:

'And in the selection of such person I recommend, but do not require, that my assistant John Harris shall be first appointed, being satisfied that a person not a member of the University will be best suited to have charge of the Collection.'

Like Mr. John Harris, his successor Mr. J. J. Manley was also not a member of the University. And though by the instruction he has received in the Daubeny Laboratory, he has become both a member of the University and has acquired an independent right of access to the Daubeny Collections as a Fellow of the College, his status as Curator under the Daubeny Trust has not been modified in the slightest degree. As a Fellow, Mr. Manley can now ask the Curator to render the Collections useful for his own instruction, but as Curator he can always forbid the Fellow from disturbing the integrity of the Collections.

At the same time it was never intended that the Curator should control the wider policy of the Laboratory; that was the duty of the Fellows in charge, first T. H. T. Hopkins, then Edward Chapman, 1869–94, and lastly myself, 1894–1920. Both Chapman and I believed in the binding nature of the Daubeny Trust, shaped our courses accordingly, and entered into other subsidiary Trusts in respect of funds, collections, and books, accumulating all with the single idea of the Advancement of Science and of scientific teaching in Magdalen College. And we both taught a little Botany, without, however, intending that that study should, cuckoo-like, evict students of other subjects from participation in the Daubeny benefaction or in other benefactions that had grouped themselves around it.

One of Dr. Daubeny's main objects was to found a Trust for Geological Research and Teaching.

So convinced was the President of Magdalen College of the association of Daubeny's Building with at least one branch of the science of Geology, that in a letter written in 1902 he suggested the following appropriate inscription for the Building:

VOLCANI DOMUS, ET DAUBENIA NOMINE SEDES.

Whether or not the various purposes to which the Daubeny Building has been put in the past were within the intention of the pious founder may be open to question. Certainly his building has been used for purposes which are not enumerated

in his Will. But within the half-century preceding the summer of 1923 there has been no time, either by day or by night, when any student of Natural Science who had a claim under the Will to make use of the Daubeny apparatus, collections, or endowment, has not been freely admitted to enjoy his right. The valuable possession of four separate rooms on the top floor gave elasticity to the arrangements. When one room was occupied for any definite purpose, there was always another available for other purposes. Moreover, one or other of these rooms was necessary for the continuation of Dr. Daubeny's own geological work, and was being actively used for that purpose under one order of the College at the very moment when by a second order they were suddenly alienated from the service for which they had so long been used, and for which it is believed that they were intended by the Founder.

REPORT ON WORK IN THE DAUBENY BUILDING

Before the War

To our earlier account of the work done in the Daubeny Building it is now possible to add completer details of the varied activities of the first two decades after Dr. Daubeny's death. The following list of lectures has been compiled partly from advertisements of lectures in the University Gazette, partly from notes left by Edward Chapman.

List of Lecturers.

List of Lecturers who continued Dr. Daubeny's Catechetical Lectures to the Members of Magdalen College in his Building.

1855. Oct. 28. **Dr. Daubeny.**
1858. Nov. 25. **T. H. T. Hopkins.**
1860. Feb. 16. **T. H. T. Hopkins.**
1864. Dec. 10. **Dr. Daubeny.**
1865. Feb. 9. **H. G. Madan.**
1866. April 19. **Dr. Daubeny.**
1866. Mich. Term to Dec. 6. **Dr. Daubeny.**
1867. Lent Term. **A. G. Girdlestone.**
1867. Oct. 24. **Dr. Daubeny.**
1867. Oct. 31. **A. G. Girdlestone.**
1867. Dec. 12. **A. G. Girdlestone.**

Dr. Daubeny died on Dec. 12, 1867.

1868. Nov. 18. **Edward Chapman** appointed Lecturer at Magdalen College. He was at the time engaged in continuing an advertised course of Lectures on Physiology at the Museum, and we have no evidence that he used the Daubeny Building for any lectures until 1872.

At the same time members of Magdalen College had the privilege of attending Wyndham's Experimental Lectures on Inorganic Chemistry without paying the fee of £2 which was charged to members of other Colleges. It seems likely that Wyndham[1] lectured in the Daubeny Laboratory as early as 1869. Certainly he made himself well acquainted with the Daubeny collections, and was thereby stimulated to lecture upon Petrology and Mineralogy in the Daubeny Building. On 21 July 1873 the College ordered 'that a sum not exceeding £30 be placed at the disposal of Mr. Wyndham towards completing Dr. Daubeny's Mineralogical Collection'.

1872. Mich. **Chapman.** Outlines of Zoological Classification.

1873, Lent. **Chapman.** Outlines of Zoological Classification.
Wyndham. Typical Rock Specimens.

Summer. **Chapman.** Outlines of Zoological Classification.
Wyndham. Typical Rock Specimens.

Mich. **Chapman.** The Chemistry and Physiology of the Albumens.
Wyndham. The Minerals which are of importance as being the Ores of the Metals, with special reference to their chemical composition and properties.
[Ray Lankester. Introduction to Biology—the Study of Homologies.][2]

1873, Dec. **Prof. Lawson** advertised a Botanical Course in conjunction with the Biological Courses of Exeter and Magdalen.

1874, Lent. **Chapman.** Comparative Anatomy of Vertebrates.
Yule. Series of Practical Demonstrations on Physiology of Blood and Digestion.

Summer. **Chapman.** Comparative Anatomy of Vertebrates.
Yule. Practical Demonstration in Experimental Physiology.

Mich. **Chapman.** Comparative Anatomy of Vertebrates.
Yule. Practical Physiology.
MacDonald. Heat.

[1] Wyndham, Fellow of Merton, left Oxford for his health in 1872 and died in November, 1876.

[2] Lectures in square brackets [ ] were probably given at other Colleges in the combination.

	Combined College Lectures delivered in the Magdalen College Laboratory.	Other Colleges in the combination.
1874, Lent.	**Chapman.** Comparative Anatomy of the Vertebrata.	Merton. Trinity.
	Yule. Series of Practical Demonstrations on the Physiology of Blood and Digestion.	Exeter.
	[Wyndham. Mineral Groups.]	
	[MacDonald. Elements of Mechanics.]	
	[Lankester. Practical Histology and use of the Microscope.]	
Summer.	**Chapman.** Comparative Anatomy of the Vertebrata.	Merton. Trinity.
	Yule. Practical Demonstrations in Experimental Physiology.	
	[Wyndham. Minerals of Rocks.]	
	[MacDonald. Elementary Dynamics and Hydrostatics.]	
Mich.	**Chapman.** Anatomy of Vertebrata.	Merton.
	Yule. Practical Physiology.	Trinity.
	MacDonald. Heat.	
	[Wyndham. Mineral Varieties of Common Chemical Substances.]	
	[Lankester. Structure and Genealogy of Vertebrata.	
	But Exeter did not join in the combined lectures this term.]	
1875, Lent.	**Chapman.** Comparative Anatomy and Physiological Chemistry of Digestion.	Merton.
	Yule. Experimental Physiology.	Trinity.
	MacDonald. Heat.	
	[Wyndham. Practical Class in Elementary Mineralogy.]	
Summer.	**Chapman.** Digestion (*cont.*).	Merton.
	Yule. Experimental Physiology (*cont.*).	Trinity.
	MacDonald. Problems in Mechanics and Physics.	
	[Wyndham. Practical Class in Elementary Mineralogy.]	
1875, Mich.	**Chapman.** A Course of Demonstrations on the Chemical Physiology of Animals.	Merton. Trinity.

		Other Colleges in the combination.
Mich.	**Yule.** A Course of Demonstration on the Elementary Physiological Properties of Muscle and Nerve. Physiology of the Nervous System. [Wyndham. Practical Class in Elementary Mineralogy.]	Trinity.
	MacDonald. ?	
1876, Lent.	**Chapman.** Anatomy and Classification of Mammalia.	Merton. Jesus.
	Yule. Physiological Chemistry.	Trinity.
	MacDonald (Millard Lecturer). Elementary Dynamics and Hydrostatics.	
Summer.	**Chapman.** Classification.	Merton.
	Yule. Vertebrate Embryology.	Trinity.
	MacDonald. Problems in Elementary Physics. [Wyndham. Minerals of Rocks.]	
1876.	**Lazarus Fletcher**[1], on being appointed Millard Lecturer in connexion with Magdalen, Merton, and Trinity Colleges conducted a course in Optics and other branches of Elementary Physics in the Daubeny Laboratory. When in 1878 Fletcher became an assistant in the Mineral Department at the British Museum, **H. B. Jupp** (p. 117) acted as his Deputy and lectured at Magdalen. Later the work was continued by **H. B. Dixon.**	
1883, Lent.	**Chapman.** Practical Course on Elementary Vegetable Morphology.	
Mich.	**Chapman.** Vegetable Histology.	
1884. Lent.	**Chapman.** Vegetable Histology.	

Chapman's Report on Science Tuition.

In 1882 Chapman was elected to a Fellowship as Tutor in Natural Science under the powers given to the College by the new statutes of the Commission of 1881. The duties of a general Science Tutor were gradually becoming more and more complex, and on 27 October 1884 he was asked to report on the whole problem of College Tuition in Natural Science. When acting as his literary executor, I recently

[1] Afterwards Keeper of the Mineralogical Department at the British Museum and Director of the Natural History Museum in 1909. He died in 1921.

found the following draft of his report, which was previously unknown to me.

I can best comply with the above request by first of all describing the existing tuition in Natural Science, and lastly making such suggestions as I have to offer.

Your Tutor is at present required to teach, or to arrange for tuition in the following subjects in the Honour School of Natural Science, viz. Physics—Chemistry and Biology, this latter one being understood to include the two distinct honour subjects of Morphology and Physiology. Below this comes the Preliminary Honour School in Physics and Chemistry, through which every student has to pass, and finally comes the Pass School Group C, which unlike the Preliminary Honour School, confers no benefit on the student beyond a Testamur towards his degree, while the Preliminary Honour testamur releases him from the obligation of undergoing the examination in Physics and Chemistry in his First Medical Examination.

Now it is obviously impossible for one Tutor to lecture in all the above-mentioned subjects, and I have so far supplemented my own teaching by combination and payment for assistance. I may dismiss the Honour Physics with the remark that I have had no practical difficulty in the matter. This honour course can only be attempted by men equal at any rate to a Mathematical first class in final schools. The number of students is so limited, that the demonstrators at the Museum have been able to supply all the extra professional teaching required.

In the Preliminary branch a great want is felt for instruction in Mechanics, a serious stumbling block to many beginners. I have from time to time induced Professor Clifton to let his demonstrators give a course of lectures adapted to the requirements of students for this school, and the rest I have supplied myself.

It would be a great help if some lectures in Elementary Mechanics could be given by the Mathematical Tutor in College, and thus assist the Natural Science Tutor by sending on men who have some knowledge of elementary Algebra and Trigonometry.

The Preliminary Chemistry (practical work done at the Museum excepted) has been entirely in my own hands, and although this along with the Physics takes up much time, I have always clung to it as it brings me into personal contact with every Natural Science Student of the College.

The Honour Chemistry. I have given over entirely to Dr. Watts, feeling him to be from my own knowledge and experience the best Tutor from all points of view obtainable, and for his assistance I have paid him £5 per man per term.

The two divisions of the Biological School overlap, in that the honour examination in each requires a knowledge of the elements of the other, counting as a part of the work for honours. Thus the Physiologist must in all cases begin with the study of Morphology, and

the Morphologist after some progress must study the elements of Physiology. The teaching necessary for this school I have taken in hand myself, and by combination and arrangement with existing lectures at the Museum can supply the whole teaching required by the College free of cost, less the ordinary Museum fees received from the Students.

I may here mention that provision must be made for a class of men wishing to enter the Medical Profession and to receive the benefit of instruction in Natural Science without entering the honour schools. It is proposed to give them a 'Scientific Moderations' after which they will become Medical Students and their time spent here, will count towards their Medical degree. The first step in this matter has just been taken by the University by the creation of a Readership in Human Anatomy. I mention this here merely to observe that under the arrangements I am about to propose I shall be quite able to deal with this new class of men without any extra trouble or expense to the College.

To sum up, I am at present teaching the Preliminary Chemistry—all the Biology, and a portion of the Physics, relegating the Honour Chemistry to Dr. Watts. The number of the students on the books this term is *19*, of these 1 (Brown) is abroad, 3 are in for Moderations, and 1 not up, leaving a nett 14 under tuition. Of these 7 attend my lectures and 6 attend Dr. Watts, 1 goes to Public Lectures only.

In justice to myself I must state that two more, Brown and Farmer, will be added to my class next term.

Conclusions. On the foregoing facts the advice I venture to offer to the Board is grounded on two considerations, viz. (1) what is best for the student, (2) what is most for the reputation and advancement of the College. On the whole I think it would be well for the Board to appoint a tutor in Chemistry, who would be responsible for the whole honour work and if necessary assist me in the Preliminary work. Speaking for myself such a course would relieve me from a considerable pecuniary loss, about which I do not wish to say any more. To the students I believe it would be a gain to have a man in the position of Tutor. To me it would be a great assistance to have someone responsible to the College for a definite share of work, and I believe *more* work could be got out of him under the system I propose.

As the Board gave me considerable latitude in the question it has proposed, I trust I am not going beyond my powers and what is asked when I say that *I do not* recommend them to elect a Fellow either by examination or selection for this work at present. I know from my own knowledge of the younger Chemists that election by examination would be a hazardous experiment, nor would the College have the same power to make alterations in its staff should circumstances in the future require it. All suitable arrangements, on the other hand, could be made with a Tutor, who would prove his value or the contrary,

and the College would remain free to take any subsequent action it found desirable.

Should the Board proceed on these lines, I propose to retain as Senior Tutor as at present, the supervision of the whole body of Students; teaching as stated above and establishing, in addition, a practical class in the College Laboratory in conjunction with the courses going on at the Museum.

Should the Board not think it desirable to appoint a Tutor as suggested, I shall then venture to ask if a portion of the Stipend lately assigned to Mr. Yule as Natural Science Tutor might be given to me to enable me to provide for extra tuition.

I should of course be ready to surrender such extra payment if at any future time the College saw fit to appoint another tutor for the work.

Science Tuition after 1884.

From this time onwards it became the practice at Magdalen for the Science Tutors to devote themselves less to giving instruction by Lectures to Classes than to personal instruction to individual undergraduates at such times and in such amount as met the requirements in each case. This was the custom of Chapman during his later years, and it being in the interests of the men it was followed by his successor for another quarter of a century.

In 1888 J. J. Manley was appointed Daubeny Curator, and a few years afterwards took charge of the teaching of Practical Chemistry and Physics within the Laboratory. R. T. Gunther, who was appointed Senior Tutor in Natural Science in succession to E. Chapman in 1894, naturally inherited the use of the Daubeny Building and its collections within the terms of the Will of Dr. Daubeny, as well as the use of more recent acquisitions under conditions which had been drafted by Hopkins at the time of the establishment of the Combined Lectures about 1870. In a document, which has always been regarded as the Charter of the Laboratory, it was laid down that

'The Tutors will have the use of the College Laboratory where Lectures are, as far as possible, to be given; the general arrangements as to place and time of lecturing, use of Rooms, apparatus etc., being placed under the control of the Senior Tutor in Natural Science, who may at his discretion allow the Tutors of other Colleges (with which Magdalen College may have combined for educational purposes) the

use of the Laboratory and apparatus so far as it can be done without involving the College in any additional expense.

Admission of Students.

'Persons not belonging to Magdalen College may be admitted at the discretion of the Tutors to any of the general Lectures on payment of a Fee of £1 for each Terminal Course, which fee shall belong to the Lecturer.'

The growth in efficiency of the courses of Lectures arranged by the University gradually rendered the combined College lecturing less necessary, and thus the Tutor in Natural Science, freed from the duty of much lecturing, was able to devote himself more to the giving of individual instruction, and to the inauguration of the new policy of encouraging all fit students to undertake at least one piece of original research in some branch of natural science, before beginning their professional work. The Tutor's special courses of lectures, requiring for their illustration specimens and diagrams which were not provided by the College, were delivered at the University Museum, but the preparation of the lectures and the College tutorial work were done in the Daubeny Building, which was ideally fitted and convenient for such purposes, as well as for his own private researches.

The chief results of the succeeding years have already been published, or are printed in one of the Appendices to this volume, but a few minor experiments may also be of sufficient interest to merit notice. In the summer of 1889 the Laboratory contributed materials for rigging up a *Foucault's Pendulum* in the well of No. 1 staircase in the New Buildings. The pendulum, 60 feet in length, was set swinging in the line of a telescope set up in the colonnade. The wire above the weight, as observed through the telescope, at first appeared stationary; but after a few swings showed a slight and regularly increasing lateral movement. It was a satisfactory demonstration of the rotation of the globe, which greatly interested those who witnessed it.

The *Swaying of the Great Tower* caused by ringing the bells was also investigated and measured by means of the Laboratory apparatus. Two scales graduated in inches were

fixed, the one on the top of the Founder's Tower, the other on the roof of the Cloisters, in such positions as to be clearly visible by means of a telescope from the top of the Great Tower. The stations were chosen so as to be at nearly a right angle apart in angular distance as observed from the Great Tower. When the bells were rung, the lateral movement of the top of the Great Tower, of the observer and of his telescope upon it, was readily observable and measurable by the apparent sideward movement of the image of the divisions on the graduated scales as seen superimposed on the lines of the divided eyepiece of the telescope.

Briefly, the Tower appeared to rock in the manner of a vertical spring, the lower end of which is fixed in a vice. It moved through a figure-of-eight curve, and clearly exhibited periods of maxima and minima in respect of movements in various planes, that were probably associated with the movements of the heavier bells. The greatest amplitude of the swing was half an inch, and the time was about half a second.

Another demonstration of interest to a large number of members of the College, and more particularly those of the boating fraternity, was that of the models of *Wave-motor Boats*. Two models, acquired from the inventor, Mr. Linden, the former Secretary of the Zoological Station at Naples, clearly showed how elastic fins can be attached to a small boat in such a manner that the up-and-down pitching movements caused by waves are transformed into a progressive movement of the vessel caused by the bending of the fins and the resistance of the water.

Objects the Laboratory.

Before describing in detail the work accomplished since the printing of the last report, it is due to our benefactor Dr. Daubeny and to ourselves to advert to the three dominant principles on which the Laboratory has been governed in recent years, especially as they appear to have been imperfectly understood, or even misrepresented.

Firstly, it has frequently been alleged that the Magdalen Laboratory was being run in opposition to the University Laboratories at the Museum.

Magdalen and Museum Laboratories.

This was quite a mistake. It was the consistent policy of the Magdalen Laboratory to supplement the deficiencies of the Museum—to do work that was not being done, or could not be done by the University, and thus to help our own students. When the University had no Physiological Laboratory, Physiology was taught in the Daubeny Building by Yule; Physiological Research was carried on there by Burdon-Sanderson and Gotch. When the University had no Laboratory or Apparatus for teaching Physical Chemistry, this duty was undertaken by Wilson at Magdalen. When the crowds of chemists who came back after the war could find no other accommodation elsewhere, as many of them as possible were received in the Daubeny Laboratory, even to the great detriment of other purposes for which staff and room were required. In early days the College Laboratory opened in the evenings, when the University Laboratory was closed, or devoid of demonstrators. It provided its workers with elbow-room, pleasant surroundings, clean glass of good quality, discipline so that a worker might be sure of returning to find his experiment as he had left it, and, above all, with good and reliable chemical balances and weights, of a standard of reliability to which the University Chemical Laboratories have, so it is affirmed, never attained.[1] All men were free to try both laboratories, and to select the one they considered the best for their advancement. There was no thought of 'competing against the Museum'. The modern policy of the Professors seems to aim at obtaining a monopoly of fee-receiving, for the purpose of increasing salaries of demonstrators, without insistence on the provision of balances and other apparatus at the

[1] On this subject a tutor of great experience wrote in June 1923: 'I very gladly say how much the Magdalen Laboratory has been appreciated. My pupils heard with dismay that it was to be closed, for having had experience of the Museum they did not wish to repeat it. From all I have heard from my pupils, the teaching and arrangements for quantitative work have been better than anywhere in the University. I have never sent one—and all from here have gone for many years past—who has not reported in the highest terms of both. I earnestly hope you may be successful in preventing the closing.'

high level at which they were formerly maintained at Magdalen, on the same fee.

Assistance to poor students.

Secondly, the Daubeny Benefactions enabled great attention to be given to the needs of the poorer men. Commissions might take note of the Lectures and Practical Demonstrations that were given by Lawson, Chapman and Yule to artisans on Saturday nights. In this volume reference is made to refugee Belgian and Serbian students, as well as to soldiers, who attended Courses. But most important of all were the poor, unattached students who used to come in the evenings and make experiments for a lower fee than was charged for courses at the Museum. Some of them were occupied with other work during the day, perhaps attending courses for another School, perhaps earning their livelihood by teaching as schoolmasters or otherwise. Many of these men have since justified their night-work by qualifying for schoolmasterships.

Without the Daubeny Laboratory, such work would have been impossible. But when the Museum heard that we were admitting workers at reduced fees, it set up the cry of 'Competition'.

Loans.

Our poorer undergraduates at Magdalen have frequently been helped by the loan of apparatus or specimens. It is well for a great College to have the means to lend a medical student a microscope or microtome, or human bones, &c., for study in his own rooms. It is, after all, only what the College does in respect of Books, but whereas Commoners are charged fees for the use of the Library, no such fees have ever been charged for the use of loans from the Laboratory. Again, the University itself had regular assistance in practical examinations by the loan of apparatus. No University Department would similarly interrupt its work by lending apparatus to a College Laboratory!

Research.

Thirdly, there was always the example of the Founder as a Researcher. We have never ceased to insist on the paramount importance of Research as a completion to the training of the best men, or as a substitute for work for examinations in exceptional cases. A feature of the second volume of the

Register was a bibliography of scientific work by Magdalen men, and this bibliography is continued in the present volume. Research is the best index to the efficiency of a Science School. Oxford chemists have since adopted Research as a necessary part of the preparation for an Honours degree, but their statute is very hard on certain individuals to whom an Honours degree is of value, but who lack time or money for prolonged research. It is just in this matter of Research that the Daubeny Collections have a special value. And once such a piece of work has been going on in a particular environment for a long period, then that particular environment becomes a necessity for the completion of the original programme.

An appreciation.

The following appreciation of the Laboratory policy was received in the summer of 1923, when the College was actually planning the discontinuance of laboratory teaching in the Daubeny Building. Like several other letters received at the time, it was written by one who had himself worked in the Laboratory, and knew that the chief opponents of the system were the Science Professors who had come from other Universities and who had not familiarized themselves with the local conditions in Oxford.

'I am very sorry to hear a rumour that Magdalen is going to shut down its laboratory. As an old Magdalen man I naturally have an affection for the place and I should not like to see the laboratory disappear. Not only has the laboratory served Magdalen well, but it has played no small part in the development of the Chemistry School in the University—one has only to recall the names of those who during past years have done part of their work for the Final Schools in the Magdalen laboratory.

Even with the recent extensions of the University Laboratories I should have thought that College laboratories could still play a useful part. Research students seem to multiply every year, and it is hard to find space for them. The Magdalen laboratory has always seemed to me to form an admirable self-contained unit, and would be ideal as a research laboratory. Apart from research the College laboratories do afford opportunities for College Tutors to develop special lines of teaching. It may be difficult to start such courses in the University Laboratories owing to lack of space or suitable facilities, for a new

course is bound to be at first a tentative experiment. If the course stands the test of time it may be wise in the end to transfer it to the University Laboratories, so as to render it more easily available to large numbers of students, but so long as the numbers are not great the College laboratory may very likely prove more suitable than the University Laboratory. The College laboratory must, I think, help to stimulate the College Tutor's initiative.'

The War Period, 1914–1919.

Effect of the War.

During the Summer of 1914, there were twenty-eight undergraduate students working in the Laboratory. This number fell in Michaelmas 1914 to twelve, at which figure it remained until Summer 1916, when by agreement no students other than boys from Magdalen School were admitted until Michaelmas 1918. In 1915 ten, and in 1916 six Belgian Refugee students were admitted to lectures in the Laboratory. They were succeeded by about as many Serbian boys in Michaelmas 1916.

War Work.

So far as work arising out of the War was concerned, a Report on the resources of the Building was sent to the Advisory Council of the Committee of the Privy Council for Scientific and Industrial Research in October 1915, but no official notice was taken of our resources, and there the matter rested. Mr. Manley carried on various investigations which were deemed at the moment to be of national importance. These included researches on the manufacture of various glasses, on the nitrification of cellulose, and on the preparation of rice. All through the war-period the Science Tutor was employed during term-time in giving practical instruction to medical students; theoretical work in the Daubeny Building, practical instruction at the University Museum. After 1918 men were being released from active service at the front for special study at home, in order that the threatened shortage of doctors might be made good. These men, many of whom had had trying experiences in all arms of the services, came back in such large numbers, that the university laboratories once more overflowed, and qualified teachers were not as numerous as the occasion

demanded. In 1916 use was made of the Building as a base for an Inquiry as to the Damage done by Game birds and Vermin to Agricultural Crops. The complete Report was published in the following year.[1]

The importance of this matter was obvious to all who realized the urgent need to make the most of our island's home-grown food supplies, the enormous and perpetual destruction of food wrought by rats and rabbits, and that sparrows alone were responsible for damage estimated at three quarters of a million pounds sterling. Clearly the adoption of some measures was imperative; but the logic of our War Governments was not very easy to comprehend. The Departments or Controllers of Agriculture and Food wished citizens to shoot as much vermin and game as possible, but the Ministry of Munitions denied them the powder and shot necessary for the protection of their growing crops.

Several of the more important recommendations published in the Report have since been adopted by the Board of Agriculture and by local authorities, but the chief of all pests, the brown rat, is still with us, and only as recently as last December 20 was it reported that the spirochaetes of which he is the carrier had caused the death of two East Lothian miners. Another scheme of experimental work to meet War shortages that was considered appropriate to the Laboratory was that of the preparation of certain drugs from herbs that could be grown in this country. To this end it was proposed[2] that the herbaceous beds in the north-west quarter of the Physic Garden should be dug over and replanted with certain medicinal herbs, so that not only might an example be set to other cultivators, but that the Physic Garden itself might do something to justify the very great amount of fuel that was being burnt to keep plants warm at a time when many teachers and students were unable to work efficiently owing to lack of coal. This proposal, however, only had the effect of further disturbing the relations between the Laboratory and the then Professor

[1] Gunther, *Report on Agricultural Damage by Vermin and Birds in the Counties of Norfolk and Oxfordshire in* 1916. Oxf. 1917.

[2] *Oxford Magazine*, Feb., 1917.

of Botany, which was to be regretted, for one of the first acts of the Professor's successor in the Sherardian Chair was to dig over and rearrange all the beds in the garden. During the war-period the Vice-Chairman of the Special Committee set up in Oxford under the Cultivation of Lands Order of 1916 wrote that there were at that moment several hundreds of men asking for the opportunity of helping every available acre to make 'its contribution to our home-grown supplies of food'. The Physic Garden might certainly have appropriately helped with Materia Medica.

This opportunity must be taken of recording our obligation to the Fuel Controller who, when supplies in College were of the scantiest, dealt generously with the Daubeny Building on the ground that it was a useful institution.

In 1917 too an application for the use of the lecture room for social evenings for hospital patients had regretfully to be refused on the ground of probable damage and certain interference with more legitimate uses. But we were able to offer to assist in the treatment of patients from the Base Hospital, who were suffering from shell-shock.

A six-inch lathe and tools, recently acquired for the workshop at Mr. Lee-Warner's sale at Walsingham Abbey, was immediately useful for the treatment of soldiers sent to the Laboratory by Dr. Hurst. Mechanical exercises have since been widely adopted on a large scale elsewhere. Our experience indicated that a shell-shocked patient would be likely to get more good by working under supervision in a shop with other men, than when left for a considerable time alone.

With the passing of Michaelmas Term 1918, Mr. Manley's connexion with the teaching staff of Magdalen College School ended, and the boys ceased to visit the Daubeny Laboratory. He had been appointed Science Master at the School in Lent Term 1889: his assistant mastership had covered a period of thirty years. In 1919 the College decided to transform a building behind Merton Street, formerly used by Varney the chemist as a mineral water manufactory, into a Physics Laboratory for the School. At the request of the School Committee Mr. Manley planned and superintended the

necessary changes and also purchased the apparatus required for equipping the laboratory. The opening of this additional laboratory made the School independent of the Daubeny Laboratory, where the boys had for many years attended experimental lectures in the various branches of physics.

The Resumption of Teaching in 1919.

During the period of the War most of the work of the Laboratory had of necessity to be temporarily suspended, but in the Lent Term 1919 the Laboratory, like other scientific departments of the University. had again an opportunity of entering a further period of usefulness.

A beginning had already been made by the resumption of the teaching of Quantitative Chemistry in Michaelmas Term 1918, when in spite of the fact that he was labouring under the disadvantage of having no laboratory assistant,[1] Mr. Manley began work with eight pupils, and in addition gave experimental lectures to a form of boys from the College School.

In anticipation of the probability of an increase in the number of our science students, Mr. Manley, as has been said, resigned his appointment at the School, and devoted his time exclusively to the teaching of members of the University (during term time) and to his own researches (mainly during the vacations). The anticipation was more than realized. The scientific institutions of the University were literally 'snowed under' by the numbers of students who arrived even before the transition from war to peace conditions had been completely effected.

Thirty-one students worked in the Magdalen Laboratory in Lent 1919, and many applicants for admission had to be refused owing to insufficient accommodation. In admitting students preference was given to members of the College and to those who had worked in the Laboratory before. The fees charged were on the same scale as that obtaining in the ordinary Museum departments, viz. £3 for three days a week, £5 for six days a week; but owing to the increased cost of materials, a raising of fees was considered likely.

There were periods during the War when more than half of

[1] Harold J. Baycock was serving in France as private No. 203355, attd. A.S.C., E.F.C.

the men up in Magdalen were reading some branch of natural science, and the average number of in-college pupils of the Natural Science tutor was six. In Lent 1918 he had only two College pupils—both Serbs! But it was just in these darkest days that the numbers of those who attended Courses in Biology as a preliminary to medicine began to grow.

However, in Lent 1919 men began to come back in numbers, and all would have been well, had our scientific teaching staff at Magdalen been complete. But all parties were severely handicapped by the absence of various out-college teachers who had not then returned, and by the absence of the mathematical tutor who had been given leave to lecture in Manchester, when he was really badly required in Magdalen. There was then no adequate help to be obtained for men who were beginning Engineering. Our failure to provide these men with the help they needed in the matter of College tuition at the very outset of their career, accounts in part for their poor performance in their Schools at the end of it.

Another adverse factor was the Coal Controller, who by reducing the fuel rations for College rooms, succeeded in putting the only available science tutor out of action for the greater part of the Lent term of 1919.

The Summer Term of 1919 was the last term in which Mr. Gunther was single-handed Tutor in Natural Science at Magdalen. His nominal pupils increased to thirty-three: the men never worked better, twenty-one passed in one or other of the various preliminary examinations for which they entered, and one, Madigan, working with Dr. Douglas, obtained a First Class in Geology. The College has never had a more satisfactory group of undergraduates reading for the various Science schools, and the tutors, to whom they subsequently went, have often spoken in their praise.

After the War, 1919–1923.

Science Demyships.

Meanwhile, the College had been greatly impressed with the need for increasing the number of Demyships tenable by undergraduates reading the various Science schools, and so an order was passed under which three Demyships were to be offered in each year for competition in Natural Science, one at least being for Chemistry and Physics and one at least for Zoology or Botany. The success was immediate, and it is largely owing to this policy that in 1923, Magdalen men broke all College records by obtaining no less than seven First Classes in the Final Honour Schools of Natural Science.

Tutorial Staff.

In Michaelmas 1919 special tutors were appointed for the tuition of members of the College reading Physics and Engineering Science, and Chemistry. Mr. Pedder undertook the former and Dr. E. Hope the latter, while those who desired to read Physiology, Zoology, Botany, or Geology were to be left by the resolution of the Tutorial Board with Mr. Gunther. There was no mention of students of Forestry or Agriculture, who were an important body of men. Fortunately Dr. Bazett, O.B.E., who had been elected a Fellow of the College in 1912, had just returned from Medical Service with the R.A.F., and although overworked, was able to undertake the Physiologists. None of these tutors was, however, able to help with Practical Chemistry or Physics in the Laboratory. Mr. Manley was fully occupied with large classes of chemists studying the methods of Quantitative Chemical Analysis, and had no spare time to attend to Physicists. Mr. Gunther had his tutorial work in the Daubeny Building and large practical classes at the Museum. And the Mathematical Tutor, though specially appointed Tutor in Physics, was averse from giving practical instruction in that subject, and the teaching of Practical Physics had to be dropped, though there were at that time many things in which the University courses in Preliminary Physics needed supplementing.

The invasion by the University.

In subsequent transactions the Daubeny Laboratory, as a College Institution, has been victimized in its endeavour to assist the University in those times of stress.

Hitherto the admission of workers to the new building, or Chemical Laboratory proper, had always been guided by the principle that priority should be given to members of the College, and that their fees should be kept as low as possible. When the College needs were satisfied, any spare bench-room was placed at the disposal of accepted students from other Colleges. It may be maintained that this custom was in accordance with the intention of the founder, Dr. Daubeny, as regards the use of the rest of his building and collections. The principle did not, however, commend itself to the present Waynflete Professor of Chemistry, who, opposed to the continued existence of College Laboratories, but unable to provide the accommodation needed for members of the University, obtained that the entire bench-room in the Magdalen Laboratory and the services of Mr. Manley should be commandeered for all Oxford men irrespective of College, and selected in reality by certain members of the staff of the Chemical Department at the Museum.

The effect was that, in Michaelmas 1919, the new extension of the Daubeny Building, added in 1902, ceased to be a private College Chemical Laboratory, and this was a first step towards its total disuse in Michaelmas 1923 for the purpose for which it was built at a cost to Magdalen College of £1,746. It has not long survived its majority of twenty-one years. During this period all who worked in it pronounced it to be the most cheerful, comfortable, and best equipped laboratory for its purpose in Oxford, and were unanimous in their appreciation of the pre-eminence of Mr. Manley as a teacher of quantitative chemistry. Mr. Manley has been taken off for other work, and the Laboratory, now divided by a partition, promises to be but little used in comparison with its earlier history. Having no proper endowment for apparatus that had become costly, an application was made for an allocation of part of the Oxford Government Emergency Grant, and £220 was received in 1920.

From the College point of view the history of the central part of the Building, which had always been primarily reserved for the purposes of the Daubeny Trust, has been even less satisfactory.

Geological Researches.

Any account of work done in connexion with the Daubeny Collections would be incomplete if it did not include some description of the geological and archaeological researches on the Mediterranean lands, which were directly stimulated and helped on by Daubeny's own travels, writings, collections, and building, and must be regarded as a continuation of his own researches on Volcanoes. In 1891, I had looked through the drawers containing Dr. Daubeny's imperfectly worked out collections of rocks brought together from the chief volcanic regions of Europe, and had been attracted by his model of Vesuvius and by his copy of the sumptuous folio monograph by Sir William Hamilton on the Campi Phlegrei, with its fine hand-coloured plates by a Neapolitan artist. A rare book, because the greater part of the edition was lost at sea.

Election to the Naples Biological Studentship in 1893 afforded the opportunity for reconnoitring a small part of the region and its sea-board, and for finding how much work still remained to be done there. A Lecturer and Tutor in Natural Science at Magdalen naturally had no leisure during Term-time for such research, but the vacations were devoted to the collection of materials for what, it was hoped, might form a comprehensive and up-to-date monograph on the subject. Reports and papers were published at intervals, and although the progress was intermittent owing to tutorial work, the central idea has never been wholly given up.

Taken in chronological order, the first paper, *The Phlegraean Fields* published in two parts in the 'Geographical Journal' in 1897–8, was a general survey of the Volcanic Craters of the region: it is quoted by modern authors, Deecke, de Lorenzo, Stefani, etc., and has long been out of print. Samples of the volcanic tufas described and analysed occur in the Daubeny Collection. A summary, with a Table, showing the chronological sequence of the volcanoes, and their gradual march seawards, was published in *Nature* in April 1898.

In 1901 a special *Report on the products of the Solfatara*, was prepared, and again with the partial help of the Daubeny Collection. In 1900 it seemed as if the next most promising line of research would be to obtain more reliable Measurements than

had hitherto been made of the Changes of the Land-Level of the Phlegraean Fields. The programme, as outlined in an article in the 'Scottish Geographical Magazine' for October 1900, was briefly mentioned to the British Association. Here, too, Daubeny's books were of the greatest service. They contained literature that was otherwise practically inaccessible to a worker in Oxford. Many necessary books are not to be found in this country at all. The best collection of books on the Phlegraean Fields is in the Alpine Club Library of the Storia Patria in Naples, but for work in England a special private collection of books had to be gathered together, and these were housed in the Daubeny Building.

Earth-movements.

A paper on *The Submerged Greek and Roman Foreshore near Naples* was published in 'Archaeologia' in 1903. It is an extensive survey of many submarine artificial structures along the Italian coast which had not previously been mapped or described. The British Association helped the Research by a Grant. The College did not give any direct help other than the use of quarters in the Daubeny Laboratory, which was essential as a separate repository of an accumulation of papers, etc., which had then become extensive. But a room there was of the greatest service. The geographical and geological aspects of the discoveries were treated in *Earth-movements in the Bay of Naples*, published in the 'Geographical Journal' for August and September 1903, and further historical observations, *Changes in the Level of the City of Naples*, were noted in August 1904. In the summer of 1905 the survey of the Italian coast was extended, and continued as far south as Alexandria.

In 1908 a *Bibliography of Topographical and Geological Works on the Phlegraean Fields* was issued. It was a literary survey covering Daubeny's books, my own now extensive collection, the books in the Bodleian, in the British Museum, and in the Storia Patria Library; it was contrived on a new system and included about three times as many entries as any older bibliographies, 2,200 separate titles and editions being enumerated. It was to serve as the groundwork for three separate monographs which were projected to deal with various problems connected with the region. Of these

the first part, *Pausilypon*, 1913, was intended to settle beyond question the distribution of the Roman seaside sites on Posilipo, and the level of the land at that period. The second part was planned to give an account of the extension north and south of the Bay of Naples, of the indications of the crustal movements which had so profoundly affected that Bay, but from 1914 to 1920 the authorities rounded up all the survey maps of Italy, and thus put a stop to further progress. The third part was planned as a complete treatise on the Phlegraean Fields, their topography, geology, petrology, history, to be illustrated by recent photographs and sketches and by certain original *gouache* drawings by de Fabris, the Neapolitan artist employed by Sir William Hamilton.

Research Fellowship for Geology.

On December 16, 1920, Magdalen College generously agreed to devote a Research Fellowship to this very subject, '*To continue and complete within seven years the investigations already commenced on the archaeological and geological changes of level in the Mediterranean Basin.*'

This order seemed to afford an opportunity of completing and publishing the research in a satisfactory style.

The accumulated surveys and materials were being housed in quarters in the Daubeny Building; and so long as they remained there undisturbed, it was always possible to resume further work with hope of success. The work had by now acquired an increased importance in consequence of the modern theories of Wegener and others relating to the crustal movements of the earth, and also because many of the observations and measurements had been made before recent displacements of coast-lines due to the Messina Earthquake; and the project was warmly supported by Sir Archibald Geikie, who knew the region and the problems well.[1]

By having a repository for my collections, in fact a base, in the Daubeny Building, which could be used as a depot for rocks, fossils, books, papers, instruments, and other necessaries, so arranged that they could be found again at any moment when needed, much could be accomplished, and with great economy of time; as space was required for dealing with

[1] Cf. Lake and Rastall, *Textbook of Geology*, 1920.

all kinds of materials illustrating facts concerning sixteen hundred miles of coast-line during a period of several thousands of years, as well as with the geological specimens collected by Daubeny and myself.

Also, as the time allowed, seven years, seemed to be ample for the purpose, and feeling secure of the customary privileges to which a Fellow of the College then had a right, and especially of a suitable room in the Daubeny Building, the tenure of which then appeared to have been confirmed by the words of the College Order, the leave of the College to complete two other considerable pieces of work was sought and obtained. One work was for the College on the Goodyer Botanical MSS. which I had found in the College Library; the other work was for the University and all the Colleges, an account of their early Scientific Apparatus of Historic Interest. The proposals were approved by the College, which helped to subsidize both books.[1] While these two books were in preparation, it was still possible to do something on the principal subject, and I went out to South Italy again in the spring and summer of 1922.

Recently an investigation was undertaken of the Pleistocene Mammalian Bones which were being found in numbers within the College.[2] Without space in which to spread them out, the work of sorting and classification could not be conducted. So to save the tusks and bones of this remarkable find from being broken up for gravelling paths, they were stored in a room which had been built and endowed by a geologist for purposes of Geology. The College had so far recognized this claim as to vote a grant in aid of the work on the Magdalen Pleistocene bed, but this became nearly useless when the necessary accommodation was removed, and when student and collections were bundled out, old and new, Daubeny's as well as my own.

[1] *Early British Botanists*, 1922, *Early Science in Oxford*, 1920-3.

[2] See p. 373.

Note on the Report of the University Commission of 1919–1922.

Dr. Daubeny's Institution was not well treated by the Oxford Committee of the Royal Commission of 1919–22.

The Royal Commission on Scientific Instruction and the Advancement of Science of 1872 had been much impressed by an account of the work done in the Daubeny Building, which was incorporated in their Report as Appendix ix, p. 35. Moreover in their third Report at p. 51 Professors Huxley, Stokes, Henry Smith, Sir John Lubbock and others strongly urged the appointment by colleges of Lecturers in Natural Science, and the grouping together of colleges for Lecture purposes.

This Report had great weight with the Royal Commissioners for the University of Oxford in 1877, and both Mr. Chapman and Mr. Yule were invited to give evidence, which they did on October 31, 1877. Mr. Chapman expressed a hope that, should the Commissioners think it necessary to visit any buildings where scientific instruction was being actively carried on, they should include the Magdalen College Laboratory. No visit is recorded, but we know that the Commissioners, having before them the example of the work done in the Daubeny Building, approved the system of College Laboratories, and realized that they were of invaluable use in collecting science students, teaching them up to a certain point and then forwarding them for instruction to University laboratories, and also for starting new and original lines of teaching and research for which the University makes no adequate provision.

In view of our early connexion with these Commissions, and of the Daubeny Laboratory meriting their special consideration, I, as Science Tutor in charge, sent a short statement and a special invitation to the Commissioners of 1920.

The Commissioners arranged to look over the Laboratory at 4.30 on Sept. 29.

All was ready for them as they had desired at the appointed time: tea was included, for which they had accepted an

invitation, and a special financial statement had been prepared to show the utility of the College Laboratory to a class of poor men for whom, as I had been given to understand, the Commissioners desired to 'build ladders' to help them up to the University, and some special exhibits were arranged. But there was no news of the Commission until shortly before six o'clock, when a number of them turned up, all famished and with no other thought than refreshments. A few it is true walked upstairs, but they were chiefly impressed with the insecure feeling of the upper floor: no serious evidence was taken. I afterwards heard that they had treated the Botanic Garden in a similar manner.

They reported that 'Mr. Gunther also writes in defence of College Laboratories and claims that statistics show that Colleges possessing them secure better results.' (*Appendix*, p. 86.)

My defence was concerned with the case of the Daubeny Laboratory, in which Collections and Building are so intimately bound up with the Daubeny Trust, that the necessity for observing that Trust was the governing factor in all that concerned the Daubeny Laboratory, and this I desired to explain to the Royal Commissioners, so that they might mention these circumstances in their Report of 1922. In several respects the phraseology of the Report seems to be misleading. When they say that 'College Laboratories have existed at Christ Church and at Magdalen (built by Professor Daubeney chiefly for Chemistry) since 1848', *Report*, p. 117, they are on a wrong tack. Daubeny erected the Daubeny Building for his Collections, Books, instruments, and a room in which *Lectures* on Science, including Chemistry, could be given. This was not what is understood by a *Chemical Laboratory* in the modern sense. There were no work-benches for students: only a lecture table for a lecturer. The Report again suggests that the College Laboratory was maintained in connexion with the Tutorial system in Science. But that is only a part of the story: the Building was maintained because it was needed for the working of the Daubeny Trust. It was of great assistance in Tuition, but was independent of all assistance from the Tuition Fund.

Moreover, in opposition to the opinion of the Board of the Faculty of Natural Science quoted on p. 118, it may here be stated that the Laboratory extension to the Daubeny Building is not inadequate either in size or equipment for teaching twelve to fourteen chemists Quantitative Chemistry, and that a certain amount of subdivision of work *does* make for efficiency, whereas the centralization recommended by the Board does not make for efficiency. It is the difference between the carrying on of refined, quantitative work in the quiet of a small specially appointed room, or amid the bustle of a large University laboratory. If the Commissioners had heard evidence from undergraduate students of chemistry who had worked under both conditions, they would have arrived at a different conclusion.

Well, it was of great consequence that the Commissioners should go thoroughly into the special problem of each of the College Laboratories at Oxford, because on principle College Laboratories had been abolished at Cambridge several years previously, and all the Cambridge representatives on the Commission were against them, in the belief that they were run in competition with the University Laboratories. In our case, this was not true. We were doing work that the University would not, or could not do. We were also able to work more economically than could the University, and in the interests both of fair-play and of the poorer students, these points should have been brought out.

The Commission has now reported in favour of the following:

§ 71. That all the practical instruction in Chemistry and Physics be supplied in large and well-organized laboratories belonging to the University, and not in College laboratories.

§ 73. That a large proportion of the fee for ordinary Science students, and the whole of the fee for research students be paid into Departmental funds, and that the Science fees be increased.

§ 74. That it may be desirable that . . . Laboratories be erected at Oxford. . . .

The Commission is in bondage to a preconceived idea;

and, while thinking to help poor students, is in effect doing the very reverse.

Economy.

On p. 117 it is stated 'There can be no doubt that the teaching of Chemistry in a number of small College Laboratories is less economical and in some respects less effective than centralised teaching in the larger Laboratories of the University.' This is a misleading and questionable statement. The Magdalen Laboratory has in the past been economical as to financial management, and also in the factor of *time*. The distance from Magdalen to the Museum can easily account for an hour out of a working day. More time is wasted by students wandering about large laboratories than in small ones, especially when, as is sometimes the case, they do not find their work-bench in the University Laboratory ready for them. A large laboratory with only a few men in it is less economical than a small one, and Oxford chemical laboratories are empty for more hours in the year than they are full.

From past experience of the capabilities of the Daubeny Building, which extends now over seventy years, we agree with the Commissioners' suggestion on p. 118 that Laboratories devoted wholly to advanced work and research may yet play a useful part in University organization. Ever since 1894 some part of our Building has been wholly used for advanced work and research.

In the Magdalen Laboratory certain Non-Collegiate students have been given practical instruction on lower fees than in the University Laboratories. Whereas the Commissioners in § 96 ask the responsible authorities to bear in mind the supreme importance of avoiding, as far as possible, changes calculated to increase the expenditure of Non-Collegiate students: they themselves by § 71 advocate a change which in the past would have caused the poor Non-Collegiate student to be charged at the highest rate.

Value of a beautiful environment.

The Commissioners (p. 43) appear to have been impressed with the value of 'beauty of ancient buildings' and of 'their historical associations with great men' as creating an atmosphere favourable to disinterested intellectual life.

These advantages were enjoyed in considerable measure in the Magdalen Laboratory with its view of the Tower and its associations with Dr. Daubeny, Professor Liebig, Professor Burdon-Sanderson, and many others. The Commissioners in § 117 stress the value of 'congenial surroundings' in the case of Archaeologists. The Magdalen Laboratory provided them for science students in a unique degree; and in my experience a young science student is just as human and as appreciative as a member of any other faculty.

The Laboratory and Protection.

R. Bourne and Protection.

While this volume was in preparation, a former worker in the Daubeny Laboratory, Captain Robert Bourne, himself a great-great-grandson of Dr. Robert Bourne, a predecessor of Dr. Daubeny as Reader in Chemistry, was standing for Parliament as the Tariff Reform candidate for the City of Oxford. The principle of partial protection which he advocated was the principle set forth in 1730 by Edward Saul of Magdalen in his book on *The Grasier's Complaint* (p. 3). At his final meeting in the Corn Exchange Captain Bourne had the support of the President of Magdalen: it was therefore an occasion of interest to members of the College.

Within the domestic circle of the Laboratory, questions of tariffs and of trade-control are of great importance. We depend upon workable glass, pure chemicals, and first-rate optical instruments. During the War neither of the two former could be obtained. We lived on our stocks, and learnt much as to the sources of our supplies. There is no substitute for optical glass. For those who are doing research work of particular kinds, nothing but the best apparatus procurable in the world's markets will do. This is always the work of skilled men and it can seldom be sold at a remunerative price. Unless British manufacturers of optical apparatus are protected, they will be unable to retain the services of the excellent craftsmen whom they had gathered together towards the end of the War, with the result that in this country the production of instruments such as microscopes, of the first class, will go back. Some say

that the leading German optical firms are suffering from the same trouble. But at the present rate of exchange, and without a tariff, they are easily able to undersell the British workers.

Then as regards paper, Mr. Clapperton, of Sandford Paper Mills, has explained that the period immediately after the War, when German paper was not being dumped in this country, was one of the most prosperous times for the English paper industry, but now foreign countries are dumping their goods here with depreciated currencies, and English mills cannot possibly compete with them. The paper industry is not included in the Safeguarding of Industries Act. The workers at Sandford are now on short time owing to lack of orders, and this has its effect on the tradespeople in Oxford and the neighbourhood. If the industry were protected and it flourished, it would not merely be to the advantage of the employer, but to the advantage of the whole of his employees at the same time, and with their financial stability comes stability for the various tradesmen from whom they purchase their goods, who, in turn, benefit others. 'At present', Mr. Clapperton concludes, 'we cannot compete with these foreign imports which are sent here on depreciated currencies, but if given some amount of Protection the English paper industry could compete with success.' Sandford Paper.

Another case is presented by the local manufacture of explosion engines. An early inventor of an engine of this type was a Fellow of Magdalen, Edmund Cartwright, in 1823. Exactly a century later, such an engine, in combination with a locomotive carriage, an idea for which Edmund Cartwright had previously made a proposal in 1819, was being made by a former tenant of Magdalen College, Mr. W. R. Morris, and so successfully that it has become an industry of national importance and has transformed a whole quarter of Oxford into a manufacturing town. Explosion Engines.

In 1923 the following statement was issued by Mr. W. R. Morris, O.B.E.:

'Before the imposition of a tariff we were turning out approximately 500 to 750 cars per year, whereas, at the present time, we are turning out over 500 per week, and contemplate extending our output eventually to 1,500 per week. Before the imposition of a tariff

a two-seater car was costing approximately £250, whereas a car larger and better equipped, with better materials, is now being sold at £198, and wages are double what they were before the tariff. Before the tariff we employed some 300 hands, whereas we now directly control 5,000 and indirectly, through other firms, 40,000. Notwithstanding the above reduction in price, our employees are far better paid than ever.

'In my opinion, one of the principal reasons that have enabled us to increase our output and enlarge our business has been the imposition of the import duty, which has enabled us to compete with imported cars. In January 1914, before the import duty, I went to America, and found that I could get an engine and other parts manufactured to my drawings there and bring them to this country far cheaper than I could get them made here, and did bring a considerable quantity of material into the country. Now, however, we own our own engine works, directly employing 2,000 people, capable of turning out 1,000 engines a week at a price competitive with any imported engines, which state of affairs is directly attributable to import duty.

'Even after arrangements had been made for manufacturing the whole of our car in England, one certain part was still imported from America. Wishing to have an all-English car, I made arrangements to purchase this one part in England, and it was solely owing to the imposition of the import duty on that one part that enabled a certain English firm to produce the part, which they now do cheaper than importing the article with its attendant duty. That firm have informed us that they are in a better financial state than in any part of their history, and yet would undoubtedly have gone under if it had not been for the import duty on this part.

'We believe that before import duty was applied Fords at Manchester manufactured and brought their engine and gear-box over from America, whereas now it is found that they employ some considerable number of people, and make and assemble all their parts in England. It is safe to assume, therefore, that with the abolition of import duty they could obviously produce the engine again in their huge American factories cheap enough to send it to England, and would not require the considerable labour they now employ.'

The phenomenal rise of Mr. Morris's works is a matter of which any scientific recorder is bound to take note. It is commercially due to the existence of a tariff on imported motor-cars.

THE NATURAL AMENITIES OF THE COLLEGE SITE.

With Worcester, St. John's, and Wadham, Magdalen College shares the advantage of having been founded outside the walls of the city. And all through the centuries in which her character and associations were being formed, she was really in the country. Now, alas, Oxford, like every other beauty-spot in England, is suffering from the all-devouring evil of over-population that must eventually lead to her downfall. The Magdalen woods and meadows, once a part of the great continent of The Oxford Country, have become slowly, but surely, separated from it. An isthmus-like strip of connecting wildland has been snapped, and the few poles of rural Magdalen that still remain to us, must be regarded as an island, a rustic islet in a sea of suburbs.

The College is not so remote but that wildfowl and song-birds cannot visit us, nor have our streams yet become so polluted that their finny denizens cannot swim past the College walks. But that will come: encroachments rush apace.

Most of us still cherish memories of the better times, and can tell to a year when this, that, or the other lesion occurred. I write as a Naturalist, and stand for the necessity of the preservation for posterity of a large part of our native land in a semi-wild or pristine state, as a Nature Reserve. This is urged not only for the preservation of the raw material that is both stimulating and a necessity to the Biologist, but also in the interest of those among us who are in occasional need of rest and recreation. It is admitted that for the old, Bridge and Golf are substitutes, but they are artificial. Nature's own cure is that rest which is known to those who can appreciate, with Cecil Headlam, the beauty of our surrounding hills and the water meads of Isis and Cherwell, where all around 'the country is a harmony in green—the deep, cool greens of the lush grass, the green of famous woods, the soft, juicy landscape of the

Thames Valley'. The majority of us can go further afield, but to have on all sides great straths of natural meadow-lands mercifully preserved by occasional floods against speculative builders and market gardeners, has been an asset of the greatest value to Oxford. Now all is being changed. We still have our artificial gardens and a few trees in the streets, but ever-increasing piles of refuse from ever-increasing multitudes of houses are being used to diminish the flood-lands, and to increase the area of mud-coloured houses and red roofs. Port Meadow, the 'oldest stretch of uncultivated meadow-land in England', is becoming a refuse dump and a building site. In all directions wayside hedges give way to unclimbable iron fences, grass tracks to asphalt paths, beauty to ugliness, peace to petrol.

Of the road through our own domain at Magdalen, we might truly write, as of Tennyson's pathway, 'How changed from where it ran thro' lands where not a leaf was dumb'.

Firstly, the elms along the High Street went in 1916.

The exact date of their planting is accurately known, and that is rare in trees of over two centuries. The numerous drawings of various ages afford interesting material for study and comparison. Known and loved by generations of Magdalen men; figured, painted, and sketched in all street views of the College, they had grown to be as essential a feature of its beauty as they were of the beauty of the curve of the High Street. And, as Turner, Delamotte, and Buckler well knew, an artistic foil to the Great Tower.

Both veterans had recently weathered safely the strongest gale that Oxford has experienced since the year of the Tay Bridge disaster. The pressure on the taller tree must have been terrific in the gusts, when a wind velocity of ninety miles an hour was recorded. When felled, one saw the source of his strength, solid brown heart-wood twelve feet round, ringed with healthy white sap-wood extending down into large roots. Proved by a storm-test such as we rarely experience, there was every chance that this tree, duly shortened to proportions in keeping with its distance from St. Swithun's Buildings, would have gone on putting forth branches for another hundred years. There

was clearly no *obligation* for the present generation to cut down the last living memorial of old Magdalen Hall. The case of the other was different: it had a hollow trunk. But elms have wonderful powers of recuperation, and, aided by antiseptic surgery, it would have produced an interesting old tree. An old stump in which

apes examina condunt
Corticibusque cavis vitiosaeque ilicis alvo

means more than many neat rows of nurseryman's stock. The bird-life in the old elms on the High was a perennial delight to many undergraduates in 'Swithers'. Others could write more tellingly of their varied pleasant associations, of the tender green in contrast to their rugged trunks, of the autumnal beauty of their lingering leaves, and still more of the occasional brilliance of the winter tracery of their snow-fringed branches. All these have been enjoyed by many: all made for the unforgettable loveliness of Oxford.

Well, they are gone prematurely: and what have we in their place? An architectural study, culminating in the west window of the College Chapel. The whole length and elevation of Mr. Bodley's building is seen for the first time. Without trees, the front rooms of St. Swithun's are noisier, their windows dustier, houses opposite loom larger and nearer, and to the west a white-painted shop strikes the eye. Cato would have pleaded for elms along a highway, and there are many other kinds of trees as suitable, if less historical. The white-beams, that were planted at the suggestion of the late Professor of Botany, do not appear to be enjoying the situation, and one is distinctly sickly. In the meantime the front of the College and the view of the Tower is the poorer.[1]

Inside the College the entire character of the two Quadrangles has been changed by the substitution of stone-paving for grass in the St. John's Quadrangle, and by the removal of all the ivy from the walls and buttresses of the Cloisters. This appears to have come about as one of the distressing consequences of the War. Architects, perhaps finding themselves out of work, and likely to remain so, have been engineering

[1] *Oxford Magazine*, March 3, 1916.

newspaper campaigns against creepers of every sort that can be grown against a wall. Their writers pretend that the public taste for trees and plant-life on or near buildings is to be stigmatized as 'Victorian', and is dying out in the present day of good taste and good art. A slump in the sale of picture-postcards showing buildings with creepers is predicted. It is satisfactory to note that in Oxford, at any rate, a large number of the best views of Colleges, still show some vegetation somewhere, and the best-sellers, as well as the most artistic among modern picture-postcards, owe their attractiveness to the same feature. The sombre grey stone of Oxford, unless seen by some special light such as that of sunset or dawn, is enhanced by a setting of colour such as that which the crimson garlands of autumnal creepers, or the more restful and perennial greens of ivied walls supply. In the Cloisters at Magdalen the ivy supplied an excellent background to the hieroglyphic statues, which have lost the greater part of their effectiveness now that it has been removed. But a well-tended cloak of creeper benefits a stone building in other ways than by merely adding to its beauty. The overlapping leaves of climbing plants, with their carefully disposed sloping water-channels and arrangements for drip, form a roof-like penthouse that, like the less efficient drip-courses round a gothic building, keep rain and sunshine and weather from walls that if uncovered would rapidly suffer through exposure.

By counselling the entire removal of ivy, architects, with some slimness, recommend a procedure that begins by the exposure of an ugly scabrous surface of stone, continues in the rapid dilapidation of the wall-surface, and ends in the probable employment of one of their own craft to 'restore', and at great cost to the owner.

In our own experience, ivy does harm to wet, loose masonry, or when it gets among the upper coping-stones of a building. It acts as a preservative on vertical, well-pointed walls. Some years ago a large part of the lower storeys of the Great Tower was ruthlessly stripped of its ivy under the pretext that it was doing harm to the masonry. The exact contrary was the case. The lower part of the wall that had been creeper-clad was better

preserved than the higher parts which had been exposed to the weather, and were greatly blistered thereby.

But it is along Addison's Walk that our most extensive and hurtful war hatchment, the Holywell Allotments, has been laid out. Doubtless these tawdry plots and shanties are a matter for rejoicing to those who are satisfied with a system of civilization, a system that has been defined by Hudson as our 'method of outwitting Nature by the removal of all checks on the undue increase of our own species'. But to the poet and naturalist the altered aspect means the destruction of the solitude, of the ideal surroundings that help the one

> to pore
> The old Greeks' idylls o'er and o'er,
> Creating nooks of freshest green
> By mild sea-bays, the fancied scene
> Of those bright pastorals.[1]

and place the other in mourning for the disappearance of numberless and beautiful animals and plants. Like the poet, he cannot obtain much inspiration from the cabbage-patch. He cannot find it in his heart to love the forms by which the wild and spontaneous has been replaced; these are tarred with the brush of cultivation and domestication, the evils from which he desires to escape to draw an occasional breath of fresh air. Those who know the grace and spirit which freedom and wildness give can be satisfied with no other substitute.

The Magdalen Walks go round a triangular water meadow. The near side is too near the College buildings and the far side is too near the slums of St. Clements to be ideal. The straight north walk to Dover Pier was the only one along which it was possible to get out of sight and remembrance of buildings. It is along this walk that the allotments now obtrude their acreage. But it is only fair to our predecessors in the eighteenth century to recall their sentiment in such matters; for it may be that it was just to them that we owe these amenities. **Joseph Addison,** after whom the Walk is named,

[1] Faber, *Poems*, 1857.

wrote charmingly on the several acres about his house, which he called his garden, and which 'a skilful gardener would not know how to call'. A foreigner would look upon it as a natural wilderness, and one of the uncultivated parts of our country. After describing the profusion of his flowers, he adds, 'There is the same irregularity in my plantations, which run into as great a wildness as their natures will permit. I take in none that do not naturally rejoice in the soil, and am pleased when I am walking in a labyrinth of my own raising, not to know whether the next tree I shall meet with is an apple or an oak, an elm or a pear-tree . . .' 'There is another circumstance in which I am very particular, or, as my neighbours call me, very whimsical; as my garden invites into it all the birds of the country, by offering them the conveniency of springs and shades, solitude and shelter, I do not suffer any one to destroy their nests in the spring, or drive them from their usual haunts in fruit-time. I value my garden more for being full of blackbirds than cherries, and very frankly give them fruit for their songs. By this means I have always the music of the season in its perfection, and am highly delighted to see the jay or the thrush hopping about my walks, and shooting before my eyes across the several little glades and alleys that I pass through.'

His remarks on his winter-garden of evergreens are also well worth perusal, and he concludes with a mention of his love of birds: 'It is very pleasant, at the same time, to see the several kinds of birds retiring into this little green spot, and enjoying themselves among the branches and foliage, when my great garden, which I have before mentioned to you, does not afford a single leaf for their shelter.'

At the farther end of Addison's Walk at Magdalen we had such a winter sanctuary for wild birds. A view of the Great Tower from close behind made it a place of refreshment and delight to thousands who rested close by on their walk round 'Adders'. Warde Fowler knew and loved it well. The 'civilisation' of this spot by the introduction of a cage of fancy pigeons and an enclosure of captive water-fowl has bereft our Addison's winter-garden of its special charm and value.

Nor have the intruders only proved hurtful to the terrestrial fauna and flora. The flat feet of the ducks have patted many waterside plants out of existence; and whereas the pond was previously one of the habitats of the exquisite little fresh-water Polyzoan (*Plumatella repens*), that species is no longer to be found there. Doubtless large numbers of the public and others take delight in the enclosed birds, but a site for them might easily have been found elsewhere than in Addison's evergreen paradise. It is a struggle between incompatible ideals, but it is a pity that when a College has acquired a world-wide reputation for a certain unique natural possession, every effort should not be made to conserve that possession. The natural beauties of the Magdalen Walks were such a possession, and the Fritillaries in the Meadow were another. The first has been greatly marred, and the second are in danger of being exterminated if their sanctuary be thrown open, as in late years, to the deer. It is, however, a relief to find the College grounds quoted as recently as June 1922 as a habitat of *Hieracium amplexicaule* L.,[1] and there are other botanical treasures as well.

Beyond our bounds the country village of Headington has become a great suburb, and even threatens in parts to become a city with a large industrial population. Magdalen has been greatly indebted in the past, and is still indebted, for the preservation of a partial contact with the 'country', to the public spirit of the Morrell family, who have hitherto resisted the temptation to develop their beautiful park on the slopes of Headington as a building site. For generations the lands of Headington Hill Hall have served as a natural bridge of communication, or half-way house, from the wild lands of the Oxford country and of the outer world to the *rura in urbe* in Oxford.

London Nature Reserves.

In London every effort is now being made to create 'Nature Reserves' anew. *The Times* printed the following plea in February 1922:

'London birds ask for nothing but that Nature should be left alone. It costs nothing to do this. The outer banks of

[1] Botanical Exchange Club 1922.

this area [i.e. in a London Park] are well adapted for birds, and it was here that willow-wrens and lesser whitethroats reared their broods, thanks to the war, which so reduced the staff of gardeners that they were unable to cut down and remove a small patch of natural herbage and undergrowth on the banks of the enclosure. Henceforth vegetation, including weeds and brambles, if they appear, are to be allowed to run riot. It is now a favourite resort of sand-pipers on their journey northwards, and of hedge-sparrows and wagtails. When a little planting with blackthorn, bracken, brambles, and thistles, has been carried out, and the grass has been left unmown for a few seasons, it will be a paradise. Will it be possible to secure that nature is really left alone to run her course?'

And if in London, why not in Oxford? and more particularly in Magdalen?

The encouragement and preservation of bird sanctuaries, safe from the irritating presence of 'gardeners' and of gardeners' boys, costs but little as compared with other forms of gardening. A member of Magdalen might well ask:

> Cur valle permutem Sabina
> Divitias operosiores?

The answer is Because of the Over-population.

When proposals are made for the employment of the unemployable in making roads and building houses, but little account seems to be taken of the fact that the beauty of the country is an important factor in the health of the nation. And by the term health, every kind of health is intended, mental as well as physical. To the Oxford student in particular The Country is a necessity, for of it may be affirmed what Sir Henry Wotton said of angling: ''Twas an employment for his idle time, which was then not idly spent: for angling was, after tedious study, a rest to his mind, a cheerer of his spirits, a diverter of sadness, a calmer of unquiet thoughts, a moderator of passions, a procurer of contentedness: and that it begat habits of peace and patience in those that professed and practised it.'

Izaak Walton knew it, and all the Oxford poets have known

it from Drayton and Tickell to the moderns. But few have visualized the supreme value of our local amenities more vividly than the author of *Thyrsis*, or the **Oxford Tutor**, whose *Year with the Birds* will be an ever-living memorial to his literary skill and the genius loci.

Addison on the real Natural Philosophy.

But as it is of Magdalen that we are writing, and of and for Magdalen men, it is meet to conclude this section with the words of a Demy of the College of 1689. Natural Philosophy, he truly explains, 'does not rest in the murmur of brooks and the melody of birds, in the shade of groves and woods, or in the embroidery of fields and meadows, but considers the several ends of Providence which are served by them, and the wonders of Divine Wisdom which appear in them. It heightens the pleasures of the eye, and raises such a rational admiration in the soul as is little inferior to devotion'.

He goes on to say that 'it is not in the power of every one to offer up this kind of worship', that a survey of nature's works does produce a cheerfulness of heart, and concludes that 'such an habitual disposition of mind consecrates every field and wood, turns an ordinary walk into a morning or evening sacrifice, and will improve those transient gleams of joy which naturally brighten up and refresh the soul on such occasions, into an inviolable and perpetual state of bliss and happiness'.

Those were the opinions of **Joseph Addison**, and with them all Magdalen men who have seen and known his Walk, when it was at its best, will agree. The present writer is proud to have been the first to add a large number of the original numbers of his *Spectator*[1] to the College Library, and now to

[1] The pleasure which a fortunate chance gave me of thus filling a notable gap among the works by former members of the College in the Magdalen Library was enhanced by the knowledge that, had times been normal, he would have been elected a Demy in 1688, as I was in 1888, and that he again preceded me along the Appian Way by almost exactly 200 years. And at the like interval of time we both explored the tunnel of Posilipo, wandered among the vines of Capri, visited Gaeta and other seaports between Naples and Rome. He died in 1719. I added his *Spectators* to the Library in 1921. In 1923 my hope of adequately describing the coasts he and I knew so well was killed by the scattering of my materials from the rooms in the Daubeny Building.

print new evidence that Addison was not merely a spectator, but also a creator of rural delights. His tastes in this respect are reflected by the following letter addressed to him by his brother, from his country seat at Bilton Hall near Rugby:

E. Addison's Letter.

Bilton Novr: the 7th: 1714

Sr.

Before I recd your Lettr: I had turft'd your new Walke, and tis now very hansom and plesant; to give you the better Idea of it I here send you its Demtions (viz) 105 yards long, and 17 ffoot wide, and but a very easie assent. I am now ffencing it in with a very hansom paile, 6 foot = high, and a Copeing Raile upon it with a Row of Iron Spikes to secure your ffrute; I make you a door out of the Garden into this Walke, and all this shall not cost you a great deale of money, for you know I am Mr. parsimoney and not to be branded for Extravagancy. Now for your planting; which I intirely leve to your Gardener, as also the Choyce of what trees he thinks proper for the Soyle. You seem to deslike Sickamors, so non you shall have, he has planted and is now planting in the Great Court, the Barn-yard, the Daniall's Home-Close, Tho. Eanoss his 2 Towne-Closes, and Mr. Smyths, all these Closes are about your house and the shade will be agreeable, and also a Walke of trees out of the Towne up to your great-Gate and then the Great and Little parks, and Bandy-lands etc what you planted last yeare are all Dead, a few Cherries and Apples excepted, the Gardener says they were unscilfuly managed, sett too shallow by a foot, starv'd for water, and many of them rub'd down by Cattle for want of being look'd after etc: but all thats planted this season I'le pale in to secure them, for your Article of planting will run pretty high, for the trees are fine ones and many of them as thick as your Legg, and t'were pitty to have them destroy'd for want of pales. You speake of sinking the uper part of the great pond, but tis too late in the yeare, and can not now be don for water. Tench I can not get anywhere in the neighbourhood, I have enquir'd every where, and have been promes'd som but nothing come ont. I was the other day to wayte of Mr. Shugborough and enquir'd of him, and he tells me they

are only to be had in the Duke of Mountegues ponds, and iff you had leve, he thinks tis too late in the yeare to remove them, for they are a tender ffish, I'le venture a few Store-Carpe in the pond that was last clean'd, as soon as there is a little more watter in it. Rugby Manor is not to be had at present nor I am afraide never will, for a Gen̄t: in this Neighbourhood has agree'd for it, som time agon; the Bargaine is not yet exicuted, and an accident may breake it, but at present there is little hopes. Kendall's Cottage, Nor Westleys Close are not yet com-at-able but I hope time will throw them into your Lapp. Your incloser upon the heath will not yet plow a 2nd time, and that must be don before tis Marl'd, nor will Rob: Winterton part with any more this yeare, but the next yeare he will. Before I com from hence I'll engage Mr. Worcester to manage that new Improvement upon the heat, as soon as tis redy; and he will do it at such convinient times as Workmen, and Carriage is cheep, and yet lose no time, for he is a very good manager. When I cam down I design'd to have been at his House, but I found it impossible to be an houre from your Workmen. So I live upon Cold-pie at Bilton. Your Game is mostly destroy'd for want of looking after, so I have prevail'd with Mr. Worcester to look after it: he is game-keeper to the Duke of Mountegue, and I am well assur'd he will take great care of yours. I find upon enquirey that all the Neighbourhood has made Inroads upon you, by hunting, ffishing, shouting, setting, etc, without contradiction; 2 days after I came here I met a pack of Hounds in full cry just by the Bandy-lands, but I made bold to whip them off and promes'd the Hunsman to be at the Expence of a little Duck-shott when he came next that way, and I'll be as good as my word

I am
Sr
Your most obedient and
humble Servant,
E: Addison.

pray Remember poor Belisarious.

Early Naturalists and their Benefactions to Magdalen.

It was inevitable from the extra-mural position of a College adjoining the open country, that love of nature and of animal life should every now and again be aroused into flame either in the breasts of individual fellows, or in the College as a whole. But remarkably little advantage has been taken of the natural amenities in respect of the scientific study of animal life during the many centuries that Presidents and Scholars have had the privilege of dwelling round the 'Green natural cloister of our Academe'.

The Founder's Veto on Animals.

In the earliest days of the College its members, mostly country-bred, were certainly familiar with the live stock of farm and woodland; and knowledge of the care of horses was more widespread than is that of motors at the present day. The College Stables were probably as old and as much required as any other College institution. And to many the enactment of the Founder, that no one of the Scholars or Fellow of the College do keep 'a Harrier, or other Hound of any kind, or Ferrets, or a Sparrow-Hawk, or any other Fowling Bird, or a Mavis or any other Song Bird', must have seemed a harsh and unreasonable ordinance. Some relaxation was granted to members of Corpus Christi College and of Christ Church, who were permitted by their later Statutes to engage in hunting to a moderate extent and in hawking; but it must be beyond the University radius and their sport must be 'honest', i. e. they were not to poach.

The reasons given for the prohibition of the keeping of animals in Colleges are somewhat amusing in their variety. At Cambridge it was thought that if one man may keep a dog, all will want them, and 'so there will arise a constant howling'. At Oxford the 'Save the Children' movement of the twentieth century was already in the minds of the founders of the fifteenth. The keeping of dogs was regarded as the 'taking of the children's bread and giving it to dogs'. Robert de Eglesfield considered that animals under Fellows' rooms at Queen's College might

impair the purity of air which is so essential to study; and King Henry VI put a ban on monkeys, bears, wolves, and stags in addition to ferrets and hawks when he drew up statutes for King's College.

But though means of gaining knowledge at first-hand were denied to our predecessors, it is gratifying to know that the *very first books* of value that were produced by Demies of Magdalen College were works dealing with Natural History. Nor indeed, if we except the little schoolboy grammars of Lylie, were the works of any Demy of the sixteenth century of importance sufficient to justify a place on the shelves of a reference library.

J. Claymond, Naturalist and Benefactor.

The first to write on such subjects was **John Claymond**, Demy in 1483, and later the first President of Corpus Christi College. He wrote four volumes of manuscript *Notes and Observations on the Natural History of Pliny* and, as might be expected from such a philosopher, left a memory in Magdalen associated with the most picturesque of her many old customs. He gave a sum for the purchase by the College of a Manor with meadows and pastures at Stanlake, the rents whereof were partly to be distributed after a Chapel service within four days after the first Sunday in Lent, every year for ever. 'To the President 16^{d}, to each Fellow 8^{d}, to each Probation Scholar 6^{d}, to each Chaplain 6^{d}, to each of the Clerks 4^{d}, to each of the thirty Demies 4^{d}, and to each of the sixteen Choristers 2^{d}.' The attractiveness of the old custom consists in the fact that the beneficiaries receive something out of the offertory plate in Chapel, and that that something takes, as far as possible, the form of silver fourpenny bits. The ceremony, as described about 1794–1802, consisted in the two Bursars going round the Chapel doling out from their caps, to each member, as they passed, a little screw of paper containing the money. Many believed it to have been bequeathed *ad purgandos renes*. 'Physic-money' the choristers called it.[1] When fourpenny bits were no longer minted for general circulation, another scientific benefactor of the College, Edward Chapman, procured a considerable supply by getting all the booking clerks on his Railway to collect them for the College. Now the necessary

[1] Cox, *Recollections*, p. 4.

coins are purchased direct from the mint, when the Maundy money is struck.

Claymond's picturesque benefactions included four shillingsworth (or two wagon loads) of straw to be carried to the prisoners incarcerated in Oxford Castle; the repair of his four beds in the Alms' House, purchased by him, which he wished should be preserved for ever for the charitable use of the poor; twelve pennies to be given to the Vice-President on certain conditions, 'that he may act honestly'. To help poor students he bequeathed to the College the following properties: his house at Headington, called *Hilles*, with meadows, pastures, and rights of common, the small wood called *Hasill Grove*, and tofts called *Welles Close* and *Boner's*; two acres of grass land in the plain of Golder in Pirton parish; lands, &c., at Berwick, Roke, Bensington, Newington, and Ewelme; a tenement and 8 acres at Warborough; a third part of a messuage and 27 acres at Berwick and Roke; a tenement and 6½ acres in the town and fields of Kings Somborne, co. Southants; a messuage near the Bridge at Stockbridge; *Purtoken* and *Chapelwyke* meadows, and pasture and wood called Chapel-wick Marsh, at Ashbury, co. Berks.

He also willed that quarterly payments of 5*s.* should be made to four of the more indigent of the Fellows; and that terminal payments of 40*d.* should be paid to each of the more indigent of the Demies.

Again, a toft and 3½ acres with common rights in Astwicke, co. Northants, and Newstede or Wallcrofts, a tenement in Evenley, were set apart to provide for payments on Palm Sunday to the President, Fellows, and Demies, the first named having 12*d.* The President from another fund was to receive 3*s.* 4*d.* annually, and the Vice-President and Dean of Divinity a like amount between them, to ensure that the testator's Composition be regularly read in Hall, and its provisions carried out. In default the lands, &c., were to pass to Corpus Christi College, to which he also left lands at Iffley, Headington, Cowley, Littlemore, Sandford, and Marston, and a sum of money, with which Rewley Meads was purchased. To Brasenose he left other property.

In 1513–14 a Licence of Mortmain was granted to Claymond and the Scholars of Magdalen College to acquire certain properties and to cut wood in Shotover Forest, within limits which were defined by quaint place-names, viz. 'in the limits marked out in the said Forest by stones, viz. from the oak looking towards *le Hek de Conell* to the oak near the *Seggy Lake*, the largest part of which oak stood in the wood belonging to the House of Littlemore, from the said oak to that near *Northeslade*, to the oak of *Limele Gerneing*, and from *Sondywey* under *Whitleston* to Headington Pasture, thence out of the covert to the opposite side of *Le Hek*'.[1] Shotover Forest.

In claiming John Claymond, the first member of the Foundation to become a notable benefactor of the College, as a student of Scientific literature, just as we claim our last great benefactor, Henry Garnsey, and as we claim Charles Daubeny and others, we seem to suspect a connexion. All were Demies: all were students of Biology: all were among our greatest Benefactors: all were students of New Studies. An underlying connexion suggests itself: Erasmus perceived only part of the truth when he wrote that the character of Claymond will do much 'to win over those who are apt to assert that the new studies corrupt men, and are unfavourable to Christian piety'.[2]

Passing over the school books of Lylie, the sermons of Longland, and the controversial theology of Lee, 'a young man stimulated by a hunger for renown, anxious for the reputation of a theologian, and a would-be saint',[3] no other early Demy of the College is known to have written any work of learning before **Edward Wotton**, who was the son of Richard Wotton, Demy 1482, and may have been born in a house in Cat Street under the shadow of St. Mary's Church. He became a chorister in 1503 and a Demy in 1506. His strongly pronounced scientific tastes led to an appointment as Lecturer in Natural Philosophy in 1518–19, and commended him to Claymond who appears to have introduced him to Fox, the Founder of Corpus, who made him *Sociis compar*, and gave Edw. Wotton, Zoologist.

[1] Bloxam, *Demies*, i. 17. For other facts about the Forest see J. Cox, *Royal Forests of England*. It supplied wood for a 800 ton ship, the *Woolwich*, in 1632.

[2] Erasmus, Ep. iv. 11, quoted from Bloxam. [3] Erasmus, Ep. xvii. 1.

him leave to travel in Italy for three years from 1520, to study Physic at Padua, where he graduated M.D. So it is just over four hundred years ago that we meet with the first instance of a science Demy or Fellow of Magdalen benefiting by a Travelling Studentship of a type no longer as rare as it once was, thanks to the Fellowships and Studentships offered by the Radcliffe Trustees and the University. Any way Wotton was the first Magdalen Zoologist to have the advantage of visiting Italy, and as a result 'he hath transmitted *De Differentiis Animalium*, fol. Paris 1552 by the publishing of which he obtained a famous name among learned men, especially with Michael Neander, who saith in *Succint. explicat. orbis terrae* (Lips. 1597, p. 410) that no author hath written of Animals more learnedly and elegantly than Wotton'.

Wotton also began a great work on Insects and very small animals, the manuscript of which was afterwards 'enlarged and finished' by Thomas Mouffet and was printed in folio form in 1634, with the title *Insectorum sive minimorum Animalium Theatrum, olim ab Edv. Wottono etc. inchoatum.*

It is interesting to note that Wotton was given licence to travel to improve his learning and chiefly to learn Greek.

At that time it was easily done to quench the spark of learning, and in consequence we find no further notable contribution [1] to science on the part of a Demy of the College until the advent of Dr. Daubeny in the nineteenth century. In the sixteenth and seventeenth centuries the College was too much disturbed by what Sir Henry Wotton called the Itch of Disputation, the Scab of the Churches,[2] and later it was steeped in the apathy of the eighteenth century.

On Some College Animals.

Bears.

The first mention of any animals in Macray's Register is that of bears, to the keeper of which fourpence was paid on December 14, 1485: but they were Lord Stanley's bears, and the two bear-wards (*ursarii*) were invited to dine with the

[1] The few members of the College who produced minor works have been enumerated on pp. 201–3.

[2] *Disputandi pruritus ecclesiarum scabies.*

Fellows. A new quiver was provided for the college arrows in the same year.

In 1486 the College was able to make a presentation to Archbishop Morton on the day of his enthronization of four swans, four peacocks, and twelve hares, but the Accounts do not tell us if they were offered alive or dead, or whether they were taken from College stock or shot with College arrows. The plague was in Oxford, and our own accounts would have been less circumstantial under such stress.

Magdalen Pastures.

In those early days the walls of the College buildings rose from a green sward. Ungrimed with soot and unblistered by frost the moldings and mullions were still sharp, as finished by the tools of the masons. Notwithstanding the opposing views of some of the present generation, who have supported an anti-lawn scheme by referring to historic precedents, and have inflicted an arid pavement upon us, the College quadrangles in the beginning were green and afforded pasturage. In 1487 the grass in the quadrangle was cut in preparation for a visit by King Henry VII, and the fresh hay was laid up in the granary, doubtless for the feeding of the royal horses. In the Accounts for 1519 two College horses are mentioned by name. *Gray Colman* and *The Male hors* (i. e. the pack-horse) were sold for 30*s.* and 26*s.* 8*d.* respectively.

The sixteenth century began with a severe epidemic of Cattle-plague, in consequence of which the bursars paid for 607 sheep that died 'casualiter' in one year. Some appear to have been shot by archers in the grove (1504–5), which betokens a use for the College arrows.

Much information as to College animals is to be gleaned from the report of John Dowman's visitation of the College in 1506–7. One Fellow accused the President of having wasted the goods of the College; 46*s.* in horse-bread alone, in six weeks; and not only in keeping horses, but in building a new stable. 'And when any Fellow told him the truth about these things he was exceeding angry.' The President evidently knew how to take care of himself, for he declared his accusers 'to be no longer Fellows' while the controversy about his office was going on.

Hunting and Hawking.

Question 18 was as to whether any Fellow has kept dogs of any sort, ferrets, a sparrow-hawk, or any birds for hawking, 'maviscum' (a mavis), or any other singing bird.

It was notorious that 'Morcott kept and keeps a harrier in College', 'and with others went on the land of the abbot of Dorchester stealing rabbits, and also in Woodstock park stealing game'. Dalacourt was accused of hunting rabbits. 'On account of the dogs kept by Morcott and Balkey the alms which should be given to the poor are diminished (presumably the dogs were fed on the broken meat: Macray). A party of five have in most disorderly wise, frequently hunted hares and deer by night; especially three, who in the week before Easter last carried off a tame stag from the house of a certain nobleman eight miles from Oxford, called Courte. Thirteen of the Fellows in all kept dogs, Smyth a ferret, Lenard (a clerk) a sparrow-hawk, and Parkyns a weasel. The younger bachelors and scholars were urged to hunt by day and night, but Wythers said that he only went to Shotover hunting hares with Smyth and two townsmen in the week before Christmas last.'

The royal forest of Shotover must have been a paradise for all kinds of game, and of many a species of animal that has been civilized out of existence—wild boars and polecats are but two of them. The deer and the 'connyes', and to hunt the hare had great attractions for John Thornborough, Demy, afterwards Bishop of Worcester, Robert Pinkney, and Simon Forman, who would 'goo forth to Loe's the keper of Shottofer for his houndes to goe on huntinge from morninge to nighte, and they never studied nor gave themselves to their bookes'. Both Thornborough and Forman were eminent as chemists and alchemists.

Keeping of Dogs.

Again, at the visitation by the Commissaries of the Bishop of Winchester in 1674, a special inquiry was whether any of the scholars 'weare pantaloons or periwiques, or keep dogs'. But a well-informed letter writer of the time feared that the Bishop of Winchester would not be able to prevent 'the evasion of his provisions by the tricks of those who have the old politician Satan to help them out'.[1]

Two years later Bishop Morley again found that the College

[1] *Letters of Prideaux*, Camden Soc., 1875, p. 2.

had been greatly disturbed by the multitude of dogs that were kept there. But it is only fair to note that it was at this very period that the ecclesiastical ritual of the annual decoration of the Quadrangle of St. John the Baptist on his day, with reeds and flowers and green branches of trees, was being observed in the most complete form, and also that the College Library began to acquire its first large and expensive work on Scientific Botany, the *Hortus Malabaricus*, the first volume of which was acquired in 1678, the last in 1703. Morison's large folios were acquired by the same body of Fellows, and much planting was done in the College grounds. It is not unlikely that the study of nature indicated by the acquisition of these important works throve as much among the keepers of dogs, as among the anti-canine party in the College.

Marmosets.

Among the more picturesque of the College animals must have been 'a certain little beast' vocatam *ly merumsytt* which the man Pescod was paid xii*d.* to look after, because the King was at Woodstock. The payment was made by the order of the senior Fellows, who doubtless felt a little nervous of marmosets. In the following year Pescod was given the sum of eightpence for looking after two 'mermosettes'.

She-bear.

When the allegorical figures were set up round the Cloisters (1508–9) the King presented the College with a she-bear. We do not know whether she proved a 'white elephant' or not, but it is a fact that the second cook was buried in the same year.

Swans.

Swans appear to have been kept from the earliest times. During the severe cold and heavy snow of the winter of 1490–1, the keeper of the swans received 3*s.* 1*d.* for their care and feeding. Apparently the then President also owned a swan which was kept with another at Wolvercote at a cost of 10*d.* The swans did well, and the College was able to make occasional presents, as, for instance, a swan and a peacock to the Queen in 1490, and two swans to the Archbishop of Canterbury in 1496–7. Swans were still being kept in 1541,[1] and regular

[1] In the reign of Elizabeth at least 900 private persons or corporations were licensed to keep these 'Birds Royal'. Each bird had to be marked on the bill with a distinguishing mark of ownership, which was periodically inspected by the royal Swanherd, who had jurisdiction over the whole kingdom.

payments for their keep appear in 1616 and subsequent years, the cost being about four or five shillings. When in 1683 Ashmole's new Museum was being opened by the Duke and Duchess of York and the Princess Anne, the College supply of swans does not appear to have been equal to the demand, and more were obtained from Ducklington for a banquet at a cost of 5*s*.

Black Swans.

In 1904 the Vintners' Company of the City of London, who with the King and certain towns are joint owners of swans on the Thames, commemorated, by a gift of a pair of Australian Black Swans, the unique occurrence that one of their members, the Rev. H. R. Cooper-Smith, D.D., had been at once Master of the Company and an incumbent and former Fellow of Magdalen.

This species of swan was first noticed in 1698 when one of the East India Company's ships reported that black swans, parrots, and many sea-cows were found in the South Land called Hollandia Nova. By 1865 Gould reported that the white man had almost entirely extirpated them in places where previously flocks of many hundreds could be seen together. 'One of the most deadly means of killing off the black swans was to chase them in boats, and either to net or club them, when they had shed all their flight feathers.' Whalers and seal-hunters caught and killed them in boatloads, not for flesh, but to take the swan's down.

Mr. Samuel Gurney was one of the first fanciers to breed them in England. He bought a pair in Leadenhall Market in 1851, but they did not breed till three years later. The first egg was laid on January 1, thus keeping to the proper Australian season for reproduction. The parents continued to breed till 1862, by which time they had hatched ninety-three young ones, and reared about half the number. A feature of great interest was that the old birds adopted our seasons, as well as their own, laying both in our spring and in the Australian spring, and so hatching two broods a year. This was on the river Wandle, at Carshalton.[1] Black swans which are descended from British-bred birds in this country

[1] C. J. Cornish.

are said to conform to the ordinary nesting-time of our hemisphere.

For several seasons the black swans at Magdalen greatly enhanced the amenities of the Cherwell along the Water Walks. Unhappily they did not do very well in the College waters and several birds died from one cause or another. They were replaced through the generosity of the Company, but as I was not at the time a Fellow-in-residence in the College, nor able to live near, I was unable to observe the birds very closely.

One year an old male black swan discovered the superior attractions of the wider reaches of open water on the Lower River, and used to absent himself even from the regular meals that he might have had had he remained near College. It rather looked as if he disliked the narrow stream of the Cherwell, which runs between a wall and a bank, and is almost entirely overhung with trees, the incessant drip from whose branches in rain must have been very irritating to an antipodean neurasthenic swan.

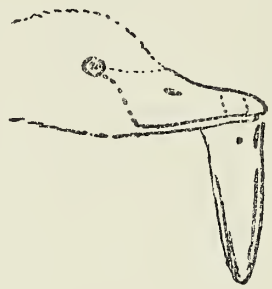
Black Swan in Winter.

It was during the hard winter of 1917 that on one of his prolonged week-ends on the Lower River, ice-floes and ground-ice cut him off from home. The river became completely frozen over from the Long Bridges to Folly Bridge, and the black swan, a descendant of forbears who had lived for countless generations in a climate corresponding to that of Gibraltar, did not venture in his ignorance to walk back to College on the frozen river, but remained swimming round the small pools of open water on either side of the island at Folly Bridge. There he visited the waterside houses, calling for food that was generally not long in coming.

On the night of January 29 the thermometer fell to twelve degrees below freezing, and on the following morning my attention was drawn to a crowd that had collected on the towing-path for an unusual sight. Under our house was the black swan trying to pick up crumbs that were being thrown into the water for him, but unable to open his red bill, a thick icicle about four inches in length hanging from it. With every dip into the freezing water the icicle grew longer. Fortunately, however, the sun soon came out, the ice thawed,

and the hungry bird was again able to open its bill, and to feed, apparently none the worse for the freezing.

The observation indicates that owing to deficient circulation in the organ, the bills of birds flying high in cold weather must frequently be at a temperature far below 0° Centigrade. Also that there is a natural difference of habit between white and black swans.



I have often observed that when a bitterly cold north-east wind is blowing, the common white swans tuck their heads under their wings to protect their long necks from the nipping and eager air. The Australian black swan, on the other hand, even though greatly disliking the wind, swims about with head erect. Moreover, it has been suggested that the gleaming whiteness of the common swan may partly serve to check loss of heat by radiation, as well as to secure invisibility in snow. Black swans are designed for warmer climates, and, partly owing to inability to wrap up effectively, might perish from an exposure that would not hurt our white birds.

Breeding of Black Swans.

In 1919 the old male bird was again left alone, and once again the Vintners revived our hope of progeny by giving a pair of fine young birds to the College. Soon after the advent of the young couple, the old bird began to make advances to the new lady, and had no trouble in cutting out her young fiancé; and to the Fellows the expectations of a young family on the Cherwell became rosy. But the amenities of the Water Walks are less to the taste of swans than to that of Addison. Our hero knew where reeds grow, where there is good bottom-feeding, and where there are beaches on which one could land without being disturbed.

It must be remembered that this was during the War Period. Rowing had practically ceased on the River, water-weeds were growing up well, and the reach above the Long Bridges was alive with water-hens and dabchicks. The waterfowl had taken possession of the deserted river, and used of an evening-time to hold aquatic sports and diving competitions; as their forbears may have done a century ago, before they were driven away by the tubbing, coaching, paddling, and rowing of men *in statu pupillari*. And once again near the Willows ran

Wing-rippled waters where shy, brown, birds dive.[1]

I have seen as many as forty out at a time.

In the summer, then, the old black swan escorted his new lady-love down the Lower River, and away beyond Iffley Lock to a retired backwater above Kennington Island, where there is a reed-bed in which white swans have frequently nested. There she started housekeeping, pulled up reeds wholesale, and, laying them around her, built up her nest. Of the subsequent proceedings nothing is known, but about the end of September the proud parents again took to the water at the head of a flotilla of six little grey cotton-woolly cygnets.

It was the first time that the Australian Black Swan, *Chenopsis atrata*, had bred on the Upper Thames.

The season was unfortunately very far advanced. It may have synchronized with an Australian summer, instinctively remembered. No doubt the unusually hot summer that had preceded may have been a contributory cause to the happy event, for with one exception the young birds were healthy and strong. As soon as the small fledglings were ready for the journey—and they must still have been very young—the old cock proudly piloted his family upstream, over the old rollers at Iffley Lock, on to the upper waters from which he had come, and which were doubtless associated in his mind with occasional feeds of the better sort.

I know not how long it took him to convoy his little flotilla from Kennington to Iffley, but the voyage from Iffley Lock to Folly Bridge took two days, and only five of the six cygnets

[1] May W. Cannan in *House of Hope*.

arrived. Travelling was especially perilous in the afternoon when the river was full of all manner of racing boats, crashing along and threatening destruction to young birds unable to elude the oars. The old birds swam slowly, trying to guard their young. Every few seconds some boat would come along, and the little cygnets, sometimes swept along in the swirl of the oars, would only escape by a quill's breadth, or by the lightness of their bodies. One was permanently maimed, and the sixth did not get through.

Black v. White.

Once in the pool above Folly Bridge, it was hoped that there might be good feeding for them, as well as safety from enemies. The first task of the parents was to drive off all the white swans from the reach, and especially from the feeding-grounds. Two fine old white birds and four full-grown young were soon routed, a flight that did not cease before they were a good quarter of a mile below Folly Bridge. The black birds evidently put such a terror into the white swans, that the latter would scout round corners warily, especially in the dusk, lest they might stumble across a lurking black enemy. At this time the mere chirp of a black swan was sufficient to declare the region unhealthy for white swans, and to turn them to seek another camping ground.

Manners and Customs.

The young family were a great joy to all the inhabitants near the waterside, and especially to the Isis Street boarding-house keepers, who offered refreshments several times a day to the young birds. Their appetites were extraordinary, and when they were being fed, the old birds would just swim round without picking up a morsel of food until their young ones were satisfied. They would come to our side of the river for a fill of soft white bread crumbs—crust they could not manage—and then swim across to the reeds for salad, and cross to the shallow water by a beach and do their toilet. In this they evidently profited by their parents' example and teaching. At first they did not reach for oil from the pygidial gland, but contented themselves with arranging the feathers on their breasts. They always stood in the water, and the feathers on their under-sides were never dry. Not until the beginning of December did I notice one preen itself properly. It appeared

to me that they were passing through a reptilian stage of no grease, and that cosmetics arrived with the black feathers which first appear in the tail.

There is no doubt but that the Black Swans are far better water-birds than their white relations. When washing, they frequently dive so as to submerge the entire body. I have never seen a white swan go under so completely.

After a late supper the family would go off to roost in a reed bed in the backwater between Folly Bridge Causeway and Salter's boathouses. There, for a considerable time, they generally kept up quite a little chatteration among themselves, and their talk would be renewed if danger threatened, as when a policeman, going his rounds, and seeing a suspicious-looking black body in the reeds, flashed his light upon them, and disturbed their peace. The hen bird had previously prepared a bed by sitting down and pulling up reeds and laying them around, as in nest-building.

It was wonderful to see what a good mother she made.

One morning one of her cygnets appeared with a bleeding head and neck, bitten by a rat we thought, but more probably by a dog. The healthy birds swam across for breakfast with their father, but as the wounded bird could hardly swim at all, the mother stayed behind, and by swimming very slowly pushed her chick across to where feeding was going on. Once there she moved off a few feet and did not take any food before her young one had had some. It swam low down in the water, lying on one side, crippled by its wound, but it was not the first to die.

Fate of Cygnets.

How the first bird went no one knew. It was when thoughts of Christmas dinners were general, and the bird was as large as a small duck. The street boys of St. Aldates slew a second, during a College meeting, with stones. A week or two later, a third fell a victim to a dog—feeding had made the birds tame—it was found, plump and well-nourished, dead in the reeds with a wound in the neck. Terrific gales probably accounted for the fourth: incessant buffeting in wind is more deadly to young birds than cold. The fifth also perished within a fortnight.

We had got fond of them. They had come from Western Australia, and were emblems to us of the country which had sent so many fine men to fight in the War. It seemed such a poor return for their heroic sacrifice, that we in Oxford could not do better to cherish the first brood of the first pair of Black Swans that had mated on the Isis.

The black swans have bred again, and on the same spot, but later achievements have not the glamour of a success at a first attempt. Last year the floods drowned a young hatching.

A black swan has also got over his antipathy to the white swans, and has been seen about with them more than formerly. When calling for food his note is a peculiar prolonged cronk, uttered with neck stretched out and head low on the water.

Poultry. Of minor domestic fowl we have but few records. But many members of the College will remember a vociferous bird which used to annoy the inhabitants of St. Swithuns from its fastness somewhere in the direction of the President's garden. It certainly was one of those 'Whose trumpet to the morn doth with their lofty and shrill-sounding throats awake the God of day' quite an unnecessary number of hours before it was time to think of dressing for roll-call, or chapel.

Peacocks. Peacocks are occasionally mentioned in our early records, and some were still owned by the College at the period of the Crimean War, 'but their choral capacities were not in harmony with the musical taste of the College', and they were disposed of in 1856. In spite of a more recent desire on the part of some to replace them, the voice of the majority has been against peacocks. For a totally different reason an offer of American ostriches for the Grove by Lord Rothschild was declined in 1894. They had been offered because the newly elected Lecturer in Natural Science had expressed a wish to study the habits of birds of this ancient group of Ratitae, then but little-known in this country. They were declined because the classical element did not appreciate the zoological importance of the group, and desired to prevent Professor Burdon-Sanderson, who spoke in favour of accepting the gift, from having any opportunity of vivisecting the birds!

Rhea Americana.

Emus. Ten years previously the College had accepted a pair of

emus. Only one arrived, in the same year as Professor Bayley Balfour. Visitors greatly petted and overfed it from the windows of the New Buildings, and it died within two years of heart trouble, fatty degeneration consequent on eating over-much currant cake. In its stomach were found stones and the neck of a stoneware ink-bottle. Its bones were of great use to pupils in the Daubeny Laboratory for demonstrating the peculiar features of the Ratite skeleton. It is a common experience that a casual specimen exhibited to a student in a somewhat irregular manner, often makes a more enduring impression upon his memory than the same specimen would have done, had it been shown him with thousands of others in an organized course.

Tortoise.

Another contemporary pet was the tortoise that lived in St. Swithuns. I never saw it, but those who did, informed me that it lived there in happiness until the College Boat went Head of the River. Some patriotic College artist then tried to commemorate the occasion by painting the Arms of the College upon the shell of the tortoise, but unfortunately also daubed his pigment over the soft skin of the neck and limbs of the poor beast, which did not long survive the honour.

Lizards.

During the War period, C. R. Jury kept a large lizard *Lacerta ocellata*, in his rooms in St. Swithuns. It ultimately escaped, and hid in an outside ventilator near the ground, whence it would occasionally emerge on warm days to the great astonishment of certain college servants. And more recently Bernard Tucker must have created a record in the line of college animals by keeping numerous reptiles and amphibians, including a pair of *Xenopus*, in his rooms in the Cloisters.

Water and Brown Rats.

It would be possible to enlarge on the educational value of college animals. Hundreds of Magdalen undergraduates have made their first acquaintance with water-voles in Addison's Walk. They have there learnt for the first time the difference between the relatively harmless water-vole (*Arvicola amphibius*) of vegetarian habits, and the voracious and ferocious brown rat (*Mus decumanus*) execrated by Tennyson

> Curse me the British vermin, the rat!
> I know not whether he came in the Hanover ship, &c.

It is not many years since rats innumerable used to frequent the rooms on the kitchen staircase. They were fattened and battened from their cradle on the refuse of the College kitchen below. L. S. Tuckwell has written of them. 'They always seemed to me to possess what has been called "the insolence of a full stomach". I would find them on my breakfast table after morning chapel, at night they would devour the candles on my piano, and even play tunes on the keys, and often in the early morning, when I awoke, I found them on the counterpane of my bed.' A few years later Tuckwell's scout told him that after the staircase had been thoroughly cleaned, whitewashed and painted, the rats had all gone. One of the workmen had seen them moving in a large body towards the river which flowed at the foot of the kitchen buildings. The scout was an interested party, for he 'bore the scar of a sharp bite which he had received from an old rat who had just given birth to a family in his scout's hole'.

The College Cat.

Rats suggest cats, or rather The College Cat.

It was matter of grief to some of us that he is not mentioned in the Statutes as a Member of the Foundation, but perhaps he is far older than the College of William of Waynflete, and so obviously a necessity, that a special clause in the statutes was as superfluous as a special allowance from the Buttery would be. The Cat is there all the same.

In Magdalen the paragon of all College cats was Dick, and his biographer was my dear friend Charles R. L. Fletcher.

'The generation of Magdalen men that remember Buttery Dick is vanishing even from the ranks of Dons. Dons are so young now, that even the most magnificent Tabby Senior Fellow gets quickly forgotten.[1] One might call Buttery Dick the "last English College cat" (in the sense in which Dean Burgon called Edward Hawkins the "last Provost of Oriel"). There are college cats still, it is true, but the immense tendency is for all cats, college or other, to get a little Persian ("Semi-Persian" is, we believe, the correct phrase) in them. But Dick, from the uttermost whisker to the uttermost tail tip, was pure

[1] Dick was a fine rich tawny tabby, inclining to apricot colour underneath.

English: the likest thing to the closeness of his deep fur that I ever saw was that of Moti, the late snow leopard in the Zoo. Moti, who was a great friend of mine, had ways resembling Dick: both abhorred raw meat (Dick, it is true, made an exception in favour of a good fat college mouse); both loved inordinately to roll on their backs—Dick especially loved rolling in snow, after which he would rise and shake himself like a great Newfoundland dog. Of his kittenhood nothing is known, but if the kitten is father to the cat, it must have been a remarkable one. I have often thought (from the point of view of an animal painter) of such subjects as "Dick's First Mouse", or "Dick's reception of the new Vice-President". He was as great physically as he was mentally and morally. When shown at the Crystal Palace, at the age of two, he weighed 18lb. and obtained a second prize. (That he did not obtain *the* first prize and the goldest medal that was ever given, simply shows the utter ineptitude and incompetence of the judges). Buttery Dick.

'Dick had been Senior Fellow for several years before the date of my own matriculation, so that I never saw him in any stage before his prime; but I think he knew a lover of cats when he saw one, for we became fast friends in the late seventies, and, though it was no doubt great condescension on his part (and he showed that he knew it), he used often to come up to my room to pass a quiet hour after his brother Fellows had left Common Room. I used to go out into the cloisters at about 9 o'clock and miaow for him, and then, after a good deal of judicious stroking from head to tip of tail, I used to give the knowing twist of the hand over the end of the tail and he would walk along beside me to my rooms in Chaplain's Quadrangle—where he knew there was a good saucer of cream by the fire (I spent a fortune in cream for Dick one time and another). It must be admitted that he was fond of his table-comforts, but this was probably because he regarded it as essential to the honour of the College that he should be fat and well liking: he would listen for the College dinner bell, even in his sleep, and walk straight to the High Table in front of the next Senior Fellow, beside whose chair he was fed. He had

perfect manners and had none of those unpleasant spitting and spluttering tricks which lesser cats display over their food. In the summer, when dinner was sometimes in Common Room, sometimes in Hall, he occasionally made a mistake and got shut out from the former. Then he would go round to the window, stand on his hind legs and mew loudly for admission: the window was promptly opened. Commemoration week was an exceedingly trying time for Dick. Not only were there a lot of fluttering females about, but they were just the sort of females who call all cats "she", and *that* Dick abhorred. Long Vacation, when there were only a few sober cat-loving Fellows left, was his ideal time.

'It is ludicrous to suppose that the penny a day allotted for his food (for he was on the foundation as much as any of us) covered his expenses, for he had a sensitive palate, and one could always tell by the way in which he walked out of Hall if he thought the dinner good enough. When he had been quite satisfied the tail was erect and the pace firm: when the reverse, he would stop and get in the way of the next Senior Fellow and look up as much as to say "I can't think why you keep that confounded cook, who has no more notion of a Salmi of game than I have of Algebra".

'Age and changes came to Dick as to all of us: but even Royal Commissions were powerless against our friend. He took no advantage of the statute enabling Fellows to marry or live out of the College—indeed he never showed the slightest inclination to change his good old bachelor ways. In the late eighties—his own very late teens—he made few new acquaintances among the undergraduates: he slept longer hours on the top of the Hall mantelpiece, seldom even awaking to listen to lectures delivered in the Hall, and finally passed away in his twentieth year.'

When, in 1904, the Audley mantelpiece was removed, the College Cat lost his favourite seat, for there is no shelf over the present fire-place. It was proposed and, I believe, carried at the College Meeting that one of the ornamental bosses in the moulding near the grate should be carved as a cat, as a memorial to Buttery Dick. But the idea did not appeal to

the mind of the then Bursar, Baker, the donor of the fire-place, and a cabbage-like boss was carved instead.

Shootings.

The trail of the stag, the scent of the fox, and the better class of country sports have had a far wider educational value on the country as a whole than the pursuit of the philosopher's stone, or of its modern equivalents. An objective that will keep people's eyes open while it takes them across country is of the greatest scientific value. The pity is that lore of the gamekeeper and the poacher, of the hedger and ditcher, of the quarryman and of others dies with them, unrecorded. These are the people who know the country, but they are ignorant of the value of their knowledge. Incidentally, it may be remarked that the trail of underground water streams, as indicated by the findings of a dowser, has in the last few years had a potent effect for good on the new study of Plant Oecology in the country round Oxford. His excursions across country with a water-finder have led the eminent Botanist, Dr. A. H. Church, F.R.S., across 'pastures new', which he would not otherwise have visited. Dr. Church had spent the greater part of his scientific life in a corner of the College property.

In the days before the establishment of the great organized games of cricket, football and the river, people had more time for country recreations than at present, and even without going the length of hunting 'by day and night' as they were recommended to do about 1507, scholars could acquire a knowledge of Nature, if they wished it, as well as of their books.

But zoological excursions were not always without peril. In 1586 one of the Fellows, Thomas Godstow, and others had been 'stealing' deer in Shotover Forest, for which he was imprisoned by Lord Norris. In subsequent reprisals Binks, the Lord's keeper, was sorely wounded; and a party of Magdalen men, going up privately to the top of their Tower, waited till Lord Norris should pass by towards Ricot, when they 'sent down a shower of stones that they had picked up, upon him and his retinew, wounding some and endangering others of their lives'.

The College arrows have been already mentioned. It has been suggested that they were to be used in defence of the fifteenth-century Presidents, but doubtless they served other purposes as well.

The armament now preserved over the mantelpiece in the Old Bursary is a survival of the flint-lock period, and is of all the greater interest now that the author had the good fortune to find the original bill for their purchase inside the cover of a book in the Library. Dr. Jenner, the then Bursar, almost certainly acquired the weapons to insure his personal safety when he went on the Lincolnshire progress in 1729. There had been several cases of attacks by highwaymen about that time, the roads were reported unsafe, a bursar on progress would naturally feel timorous. We do not know whether the weapons were ever used. Two of the four bills found were as follows:

Marlin Colidg bill 1729

Sept. 26 for powder	0	1	6
for boulets	0	1	0
for flints	0	0	3
for ye Stuwards pistoles	0	0	6
for Cleaning 3 paier of pistols & to Muscuttounes	0	4	0
	0	7	3

Walker's Bill for ye Lincolnshire Progress.

Magdalen Colleg: Debtr to James Walker

for boulets	0	1	9
for flints	0	0	4
for powder	0	1	8
for Cleaning to paier of pistols	0	2	0
for Cleaning 3 paier more & ye Muscuttoune	0	4	0
for powder	0	0	5
for bales	0	0	2
for Cleaning to paier of pistols	0	2	0
for 3 paier of horse pistols	7	10	0
for a paier of pockett pistols	1	15	0
for ye muscettoune	2	2	0
	11	19	4

July 19. 1729 Recd of Dr. Jenner the Contents of ys bill in full by Mr. James Walker.

	11	19	4
	0	14	0
	0	7	5
S. T.	13	0	9

Even as late as 1784, the Bath coach was 'held up' by armed footpads at the bottom of Cumnor Hill, and eight passengers were relieved of £24 in money.

One of the first of the modern school of Sportsmen among the Fellows was Frederick James Parsons, Demy 1815, 'a good scholar and a man of many accomplishments' who became a parson. He was 'an excellent shot, kept a brace of splendid setters, and hunted regularly'.[1]

In recent years many of the Fellows have derived benefit from shooting over the College estate at Tubney, among others the names of Llewellyn Meyrick, Dr. Fisher, Reggie Bird, Godley, Bulley, Carter, Gunther, Fletcher.

Deer Park.

The plan of the College grounds made by Agas in 1578 shows that the site of the present Grove was divided into four principal divisions described as 'Gardaines, Orchardes, Pastures and Walkes'. The College cow, about which so much fuss was made at the time of the siege of Oxford, may have been pastured therein, but there could not have been any deer. Nor is there any mention of deer at Magdalen on the historic occasion when Lord Abingdon and his dogs hunted a deer from a place several miles from Oxford 'through the water by Magdalen College, through Merton College fields and into the back gate of Corpus Christi College, where it was killed'.[2] Deer.

The first mention of deer in Magdalen comes in the Accounts for 1706 and 1707, when a charge £4 2*s.* for killing *damas in arbusto* is made. But if these were really college does, they would not at that early date have occupied more than a portion of the enclosure inside the Long Wall, for parts were fenced

[1] Macray, *Reg.* vi.

[2] Hearne, *Diary*, vii. 56.

off as bowling green and gardens. In later years venison for the Gaudy was purchased, and certainly the College could hardly claim to own a Deer-Park, till the fences were thrown down, and 'The Grove' was formed.

Deer appear in the Accounts of 1721–2; and again in 1723 Combes was paid 1*s.* 4*d.* for a basket of wicker work 'in usum damarum', doubtless to hold hay.

No deer are shown in the engraving at the head of the Oxford Almanack for 1731, but they are in that for 1787, which is the year after George III had visited the College and had noticed the deer.

A former member of the College, E. P. Shirley,[1] writing in 1867, estimated the area of the Grove at eleven acres containing forty fallow deer. Having regard to the very restricted space within the walls of the Grove, deer do very well there, but at intervals it is advantageous to introduce new blood. The Duke of Marlborough has occasionally given a buck from Blenheim, on one occasion suggesting that the undergraduates might come and catch it themselves, and in 1898 H.R.H. Prince Christian, as Ranger of Windsor Park, ordered a buck to be sent as a present from the Queen. But on arrival at the Oxford railway station the buck was found to have transformed itself into two does!

Fish and Fish-culture.

Fish-ponds.

It is common knowledge that in England's monastic days, fish stews were *de rigueur*; for instance the abbey fish-ponds at Bicester were stocked at a cost of '32 pence' in 1301 with eels, pike, and perch and such-like fish; but when Oxford was at length emancipated from the thrall of Rome, and the tyranny of a forty days' penance upon lenten fare 'with nothing but carp at least twice a week in the larder' though there were plenty of geese on Port Meadow, men by degrees converted their stews into arable and pasture land.

Magdalen College doubtless inherited many amenities besides a kitchen from the Hospital of St. John the Baptist. Some of the godly old Hospitallers would assuredly have taken

[1] E. P. Shirley, *English Deer Parks*, 1867.

advantage of their dwelling-place by the Cherwell, and have followed the craft of the Apostles; and doubtless like

> Peter and Andrew fyshed for fode,
> Some they solde, and some they sode.

We do not accuse them of angling for diversion's sake: their civilization might hardly have been sufficiently advanced for that. But the hospitallers would have had nets and lines, and may even have known how to sniggle for eels, even if they did not know Aelian's method of catching these with some cubits' length of the intestines of a sheep into which at the right moment when the eels are gobbling at one end, the fisherman blows air from his mouth, thus inflating both gut and the eels, which adhere to the expanded intestine. They may also have known how to turn to good use the crayfish, which were found in such numbers in the Cherwell, that in Wood's day the stream was 'bordured with crevisses'.

It is not unlikely that they too constructed in the water meadows by the Cherwell the first fish-stews, which were afterwards used by the members of the College.

One of the graduate scholars of Magdalen Hall, Simon Godmanstone by name, became a Fellow of the newly-founded College in 1458. In 1466 the College leased to him for 23*s.* 4*d.* a year for twenty years an orchard with ponds and a moat and a dove-cote within or near the College grounds.[1]

A 'pond' suggests fish.

This, or another *ichthyotrophion* or *vivarium piscarium* was situate between the 'cubiculum promorum' on the west and the College meadow on the east. In after years both the fish-pond and the right of fishing in the river round the meadow, and in the Cherwell beyond King's Mill from the stream called Irishman's pole to Merston lake, were leased to the College auditor in July 1551–72 at an annual rent of 10*s.*[2]

From time to time Fellows held the College deputations of fishing rights. Isaac Pocock was in 1624 appointed Deputy 'either in his own person, or by his servants and labourers, to fish as well with nets as otherwise in the haven or river, called

Fishing.

[1] Macray, i. 84. [2] Macray, ii. 27.

Shoreham River or haven, from a place called Beeding unto the town of Old Shoreham, to have, to hold, and exercise the same Fishing from time to time during our pleasure, and not longer'.

Pike, known as *dentex*, or as *lupus fluvialis* (1514) appear to have been held in special esteem, for two of these bony fish with two tench were given to the young ten-year-old Prince Arthur, when he came to stay with President Mayhew.

Sea-Fish. But pike, tench, chub, perch, carp, and even salmon[1] are apt to become monotonous. And even with all the art of the College kitchen and the accompaniment of sauces and white wine, mud-flavoured pond-fish would occasionally seem tasteless to those who had once partaken of the produce of the sea. Sea-fish were brought from Bristol, and in the early years of the College, *c.* 1485–7, the fisherman himself was occasionally a welcome guest who dined with the Fellows. Herrings were the staple salt-fish, but salt eels and ling were also used. Cod, congers, haddocks, ling, merlans and oysters were all in common consumption.[2] Early in the sixteenth century the College Accounts make frequent mention of salt-fish e.g. in 1503, 1510, 1518, and of oysters (1510) of which, the clerks frequently partook. In 1557 the Bishop of Bristol having done the College the service of consecrating a paten, was doubtless considered handsomely rewarded by a present of salted eel. But the days of cheap and rapid transmission of fish-hampers, had not then arrived; so that it not infrequently happened that sea-fish lost their freshness before they could be served at the High Tables in Oxford. But, as is duly chronicled in our Accounts, it was never wasted, the 'putrid fish' was charitably given to the poor or to famished prisoners, either by itself as in 1522, or with rotten mutton as in 1525.

A barrel of oysters was served on midlent Sunday, 1684.

The Cherwell rivalled the Thames in 'fishiness'. In 1674 the latter 'gave so ample testimony of its great plenty that in two days appointed for the fishing of Mr. Mayor and Bayliffe of the City it afforded betwixt Swithins-Wear and Woolvercot-

[1] The last Thames salmon was caught at Boulter's Lock in 1821.

[2] Falkner.

Bridge fifteen hundred jacks beside other fish'. (Plot). In 1684 a dish of fresh fish in Hall included a large jack, carp, tench, and perch served with oysters and 'anchovys sauce'.

A project has been mooted to revive the study of Fish-culture in the waters of the Upper Thames by utilizing the small waterfall of the College mill at Holywell, which is more fitted for such a purpose than any other site within the radius of any other British University. The project did not, however, find much favour with the authorities, who deemed it preferable to use the Mill-house as a private dwelling for tutors in philosophy and history. Experience has shown that it is quite possible for good philosophers and historians to live in Oxford away from the waterside; but running water is an absolute necessity for the study of what some classical people would term 'Potamology'—or the science of rivers and of their contents. The provision of an aquarium at so favourable a spot would go far to help on the study of the inter-relation of living organisms one with another and with their surroundings, for which so earnest a plea has been made by Sir Arthur Shipley in his last volume on *Life*.

Prehistoric Animals.

Not far from the north-west corner of the Grove there used to be a small drinking-place for the deer, where water rose naturally. But a good many years ago the civic authorities laid a deep drain along Long Wall, and this cut off the supply for the spring. The source of the water is uncertain: it may have been a part of the surface water that flowed from the west along the Broad following the line of the City Ditch, and, having rounded the corner of the City Walls, have made for the Cherwell across or between the Magdalen 'Gardaines, Orchardes, and Pastures'. The water-hole had been lined with masonry, which, acquiring an enhanced value during the war-time, was dug up. Below lay an unsuspected bed of pure river-gravel, of which several tons were soon removed and spread about on the College paths.

One day a super-observant labourer diagnosed ivory mixed

with the gravel, and, as he informed me, communicated his discovery to his fellows, surmising that it was worth far more than what they were digging. Whereupon some of the others proceeded to test all doubtful fragments with their pickaxes, and by fresh fractures to determine whether it was stone, bone, or ivory. The first person to call my attention to the existence of bone fragments was my friend Mr. G. de Beer, but it was not at that time realized how complete the remains were.

A century and a quarter earlier Cuvier had been interesting himself in similar finds. To him more than to any other man do we owe the idea of extinct types of animals which were unlike those now living. His idea was not accepted without much opposition and incredulity, especially on the part of those who held that the Mosaic account of Creation gave a complete account of all possible forms of animal life. So when he first publicly announced a discovery of fossil elephants in Europe, his well-read friends at once reminded him of the possible progeny of the elephants of Pyrrhus, and of triumphal processions in Imperial Rome. Even contemporary scientists refused to believe the evidence of the minute anatomical differences in bones and teeth, by which he was able to distinguish the Mammoth from the living elephant. But he had ready a yet more forcible argument. 'If, passing across the North Sea, we transport ourselves into Britain, which in ancient history by its position could not have received many living elephants besides that one which Caesar brought thither, according to Polyxenus; we shall nevertheless, find these fossils in as great abundance as on the Continent.' And this statement appears to have been true of the site of Magdalen.

Cuvier owed his great idea of the existence of extinct types, to the fossil elephants; and so 'Palaeontology may be said to have been founded on the Mammoth'.

Finds of Mammoth bones had already occurred in many parts of the Northern hemisphere. They were of importance because they had previously led to a belief in the former existence of giants and heroes. Many instances have been

cited. Spartans digging up elephantine remains at Tegea, believed them to be of Orestes, thirteen feet in length. In 1613 the skeleton of the giant-king 'Teutobochus Rex', king of Cimbri, and defeated by Marius, was taken from a 'tomb' thirty feet long. It was exhibited to Louis XII and universally accepted until Riolan exposed it, and Blainville recognized its elephantine nature. In dozens of instances similar finds have been made in various places. At Cannstadt in Wurtemberg some sixty tusks were found in 1700. The whole ones were preserved, but the shattered fragments were given to the Court physician, who ground them up to make 'Unicornu fossile', a medicine in great repute.

In Essex the village of Walton has yielded a large quantity of Mammoth remains which lay intermingled with bones of horses, oxen, and deer. In a Grays brickyard clay-diggers discovered remains from which 'a more or less entire skeleton of a Mammoth might have been secured'. Workmen-like, they broke them up, selling the fragments for three half-pence a pound to a dealer in old bones. In consequence of such procedure there is, as yet, no complete skeleton of a British Mammoth in our National Collection, and not even so much as half a one in Oxford.

It was therefore with feelings of the keenest interest that I received the news one February morning in 1922 that the gravel-diggers had found some more bones, and wanted me to visit their pit. There, sure enough, was the end of the first Mammoth tusk that I had ever seen *in situ*. It was lying lower down than its fellow which had been broken up during the earlier digging, but fragments of blackened bones and the molar teeth that were also found, all indicated that there had been a complete skull at that spot. The tusk might have originally been some six or seven feet long, and was $6\frac{3}{4}$ in. in diameter, but only some 3 ft. 9 in. of it was intact, when the superincumbent gravel was carefully removed. As it was too splintered to move without proper precautions, a mason was instructed to ensheathe it in plaster of Paris. After this casing, which covered about three-quarters of the periphery of the tusk, had set hard, we were able to loosen the

gravel underneath, and to roll over the embedded tusk on to a board. It was then removed for further treatment by Mr. Young, who cleared the rubble from the interior of the tooth, leaving only the outer shell in the plaster casing. The hollow cavity was then filled with reinforced plaster, which made a strong and effective filling. Finally the outer casing was most carefully broken off, and the tusk, looking better than when first seen, is now on exhibition in the College Library.

Associated with the two tusks were numerous fragments of broken bone; but nothing in a fit state for preservation except the two upper molars. A third molar is remarkable because the crown is worn obliquely at half a right angle to the vertical side of the tooth, as if the tooth had been pressed slant-wise in the jaw. The tusks and teeth were figured in the *Oxford Journal Illustrated* for January 10, 1923, and were mentioned in the *Oxford Magazine*.

In the same month digging began again, but in spite of promises, no news of it was brought to me until a number of other bones had been broken up, or otherwise damaged. By the end of the month a small heap of useless fragments had been accumulated; and then, coming across something larger, the men sent me word on January 31. I immediately went out, too late, however, to see the bones *in situ*, but found a pile of fragments of bones of *Bos*, *Cervus*, Mammoth, including parts of two lower jaws and teeth, and on top of all a beautifully preserved ramus, in two pieces, of the lower jaw of a Bear. This was the first occasion that the remains of a fossil bear had been found in Oxfordshire. It is one of the very few that have been found in central England, between the countries of the Fen Bears in the east, of those of Kirkdale in the north, and of the bears of Devon and South Wales in the west.

On comparing this jaw with the jaws of the Common Brown Bear (*Ursus arctos*), the Grizzly Bear of North America (*Ursus horribilis*) found at Grays and in Kent's Cavern, and *Ursus fossilis* of Goldfuss, with all the ursine material available in the British Museum, in the Museum of the College of Surgeons, and at Cambridge, I came to the conclu-

TEETH OF FOSSIL ELEPHANTS FOUND NEAR THE GREAT ELM IN THE DEER PARK OF MAGDALEN COLLEGE IN 1922

A. Tusk, $\frac{1}{12}$ nat. size. B. Molar with oblique grinding surface, $\frac{1}{3}$ nat. size. C. Young Molar of fourteen laminae of which only four have come into use, $\frac{1}{3}$ nat. size. D. Grinding surface of parts of a molar.

sion that it resembled the so-called *U. horribilis* from the Lower Pleistocene of Grays in Essex, and that jaw No. 858 in the College of Surgeons also belonged to the same species; and that these fossil jaws presented distinctive characters by which they could be separated from the jaws of normal Brown Bears (*U. arctos*) and other species. It seemed well, therefore, to make a new species of British Bears, for their reception. To this the name *Ursus anglicus* was given, and the Magdalen College jaw is taken as the type.[1]

This find proved the bone-bed in the Grove to be of first-class importance, and I again exhorted the workmen and their foreman, Jacobs, to summon me whenever they should strike bone, but on no account to endeavour to get it out; and Mr. K. S. Sandford, our expert on river gravels, was again kind enough to examine the pit.

Professor Sollas saw the bones already exhumed, and wrote a letter emphasizing the importance and rarity of the find in such a favourable situation. 'How Buckland would have envied you!' he wrote on May 21. 'But it is far too extensive a bone-bed for any one man to work out and far too important to be allowed to suffer from neglect. I think that in the interest of Science a systematic exploration of the deposit should be undertaken. The overburden should be removed from the bone-bed over definite areas and a plan made of the working. The bones as they were uncovered would require very careful surgical treatment before removal, and for this skilled labour would be necessary. The results of your preliminary examination suffice to show what a rich treasure awaits investigation.

'It seems to me eminently a case in which your College might be interested and could justly afford some assistance towards the advancement of Palaeontological knowledge. Application might also be made to the Royal Society for a grant from the Government Fund. If such an application came before the Committee for Geology I would earnestly support it.'

[1] Figures and a description of the new species were published in the *Annals and Magazine of Natural History* for April 1923.

With this advice I was most cordially in agreement, and the College made a small grant for further work. Professor Sollas wrote again on June 18 to the effect that in the light of Sandford's work the Magdalen finds assume an unexpected importance. 'They must I fancy belong to the last glacial episode but one, i. e. Riss, to which the bottom gravels which yield the cold fauna may be referred; while the top gravels ought to be interglacial, Riss-Würm. Implements are strangely rare at Summertown and elsewhere in these second terrace gravels, but I should think they might very likely be found in the Magdalen grounds. I hope you will be able to arrange for a systematic investigation.'

Shortly afterwards, as we had anticipated, more long bones, molar teeth, and tusks were found, which were carefully wrapped up with surgical bandages and removed to the Daubeny Building more or less satisfactorily with all fragments belonging. There, all pieces were first dried slowly, then passed through a hot thin solution of glue, and again dried in a hot-air bath, and placed in a locked room in an orderly manner for piecing together at leisure. During the spring and early summer fragments of numerous bones continued to come in, many hours were spent on piecing and patching, and some of the larger bones were taken up to the British Museum for being further strengthened before the fragmentary epiphyses were fitted on. The labourers still continued to destroy much: it was almost impossible to restrain them from trying to extricate the bones themselves, generally with disastrous results.

To make a long story short, the greater part of all this trouble has now been rendered useless, because, in spite of protests and letters from the Professors of Geology and of Comparative Anatomy on the obvious importance of this research, the room which only a few months previously had been specially allotted for such work, was rented to the Department of Botany. The only sympathy I received for the destruction of my previous work was an intimation that it was desirable that the room should be vacated as soon as possible. And there was no other place available for my work in Oxford.

The fragments, mixed and removed from the places where they had been grouped, have now no meaning. They have been removed to the Geological Department, where, in spite of the overcrowded state of his restricted premises, Prof. Sollas has been kind enough to give them house room, but I know that I can make nothing of them now, and even if I could complete another bone here or there, it would be poor satisfaction for the loss of the two Terms that had been devoted to the work. And, if the issue could have been foreseen, those last two Terms of free access to the Daubeny collections would have been devoted to them, rather than to the Magdalen Pleistocene remains.

Stains of ancient blood-vessels.

A palaeontological discovery of yet wider interest with which the Daubeny Building has been recently associated, is the discovery that under certain favourable conditions a colour-print of the course of blood-vessels may survive on fossil bones of immense antiquity.

The fossil remains upon which the observation was first made were five consecutive vertebrae of a Crocodile from Mr. Phillips's brickyard in Kimeridge Clay on the north side of Shotover Hill. After cleaning, the indications of blood-vessels were first noticed on these bones in the Daubeny Building, about 1916.

The newly discovered fact was so improbable and of so sensational a nature, that no scientific palaeontologist would have been likely to have believed in it without ocular demonstration. Under such circumstances in former years a discoverer, who desired credit of priority as well as to retain a reputation for veracity, would, like Huygens and the rings of Saturn, have concealed the announcement of the fact in a cryptogram. Indeed, even after the production of the specimens at a meeting of a learned society, and the acceptance of the conclusions by the greatest living experts, Dr. C. Andrews and Dr. Smith Woodward, who had both examined the bones, a sceptic was still ready to write a letter to *The Times*, December 14, 1923, as a caveat as to reported ancient blood-stains.

It was therefore of great scientific importance that the original specimens on which the observations had been made should be safely preserved for reference. Herein, I regret to say, I was negligent. I deposited two of the vertebrae in my room in the Daubeny Building, believing that to be the safest place to which I had access, and took three to my private house. Unfortunately all were forgotten until the compulsory move from the Laboratory was over; and later, the bones, which had been deposited in the Daubeny Building, were not to be found. By great good fortune two of the three vertebrae in my private house show the course of the blood-vessels with sufficient clearness to prevent my being accused of adding another to the myths of an uncritical age.

With the jaw of the Magdalen Bear these vertebrae were exhibited at the Zoological Society in November 1923, and one has since been deposited in the Geological Department of the British Museum. The appearance of the vertebrae is shown in the figure on the opposite page.

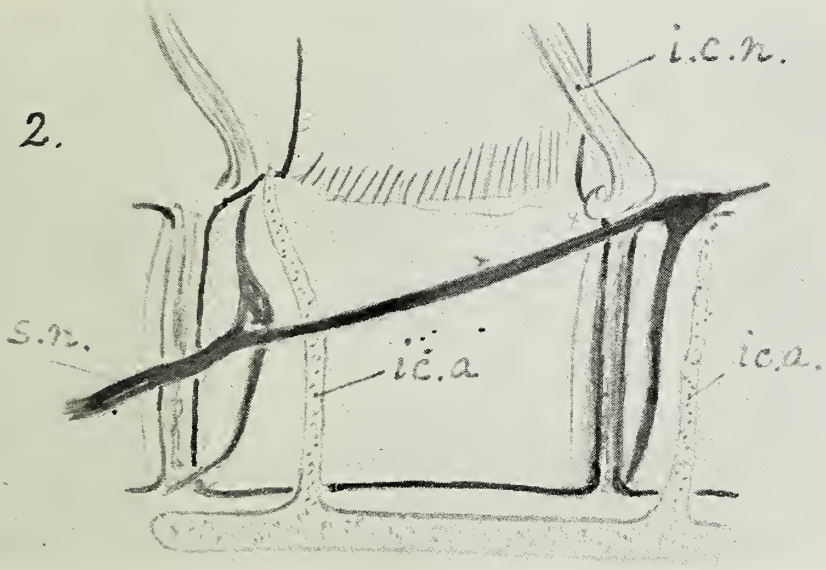
The identification of the cause of the marking has been confirmed by Mr. R. H. Burne of the Royal College of Surgeons, who was good enough to dissect a small recent crocodile. He found that in the living species the segmentally arranged intercostal arteries lie near the centre of each vertebral body, in fact nearly in the same position as that of the marks on the Mesozoic bones.

To reconstruct all the successive stages in the life, death, decay, and fossilization of a particular crocodile which lived millions of years ago would involve the drawing of too large a cheque upon the unknown. Still, just as the former chemical constitution of distant stars, even though they may have become extinguished long before our era, can be confidently asserted by astronomers, so it may also be assumed that there was some chemical difference between the blood-vessels of this particular individual and those of its fellows, or that the blood-vessels, perhaps dried on the bones, had prevented the subjacent bone from becoming stained with iron.

Meanwhile the indication of a very slight grooving on the

1.

2.



3.

1. VERTEBRAE OF STENEOSAURUS SHOWING STAINS OF BLOOD-VESSELS.
2. DIAGRAM SHOWING INTERCOSTAL ARTERIES *ic.a.* IN RECENT CROCODILE. *s.n.* SYMPATHETIC NERVE; *ic.n.* INTERCOSTAL NERVE.
3. ARTERIAL GROOVES ON VERTEBRAE OF TELEOSAURUS SUBULIDENS.

sides of the vertebrae led me to examine a very large series of well-preserved Crocodilian and other Reptilian vertebrae. By far the greater number do not show any lateral grooving whatever, but in a few cases slight indications of such grooving may be seen, and oblique lateral grooves are exceptionally clearly marked on three vertebrae of a *Teleosaurus subulidens* Phillips, from the Great Oolite at Enslow Bridge, now preserved in the Oxford Museum. In two of the vertebrae they occur on both sides, but in the third on one side of the vertebral body only.

The rarity of the indications of these segmental blood-vessels, and the fact that they may occur sporadically and on one side of a vertebra, but not on the other, indicates a variability that may be due to some imperfectly known pathological condition. It is certain that it means that the bones have grown faster, and have proved to be more plastic than the blood-vessels. Unlike many of the bones of the diseased reptiles, including Mesozoic crocodiles, which have been recently described by Baron Nopcsa, these vertebrae show no sign of exostoses, or other pathological condition. The blood-vessels may have therefore either become incapable of further extension to make room for the growing bone—a condition typical of disease or of old age; or else the adjoining viscera may have been so tightly packed as to press the vessels against the bone, which took their imprint.

Science Books and their Donors.

Inasmuch as our Founder, William of Waynflete, prescribed lectures on some useful or first-rate subjects, 'to wit Algebra, or on the Treatise concerning the Sphere, or regarding the Motion of the Planets', we must assume that he had also included treatises on these subjects, as well as the books of Aristotle, among the eight hundred books with which he endowed his newly-founded College. And such books were evidently in use, for before the close of the fifteenth century the Library copies of St. Thomas *super Phisicam* and Aristotle *de Animalibus* were in need of being bound. We still possess on our shelves two early medical books, Haly Abbas and

Ardoynus (Venice 1492) and a Rhazes, &c. (1497), the gift of **William Hasard**, Waynflete Praelector 1496–7. To judge by their date it looks as if he had purchased them for his lectures, and bequeathed them twelve years afterwards, when he died. One or two other early science books have already been mentioned on page 145, but of those that were in the Library before the close of the fifteenth century very few now remain to us.

Of the sixteenth century we have the small but interesting collection of medical and scientific books of a medical Fellow, who appears also to have engaged in the profession of a man who has been described in more recent days as a 'cock-laundress', for we cannot believe that he did the College washing himself.

Nicholas Gibbert or Gibbarde, as he signed himself in one of his books, was elected to a Demyship at Magdalen College, Oxford, in 1555; he took a degree as Bachelor of Arts in 1561, Master of Arts in 1566, and Bachelor of Medicine with licence to practice on December 17, 1571. He supplicated for the degree of Doctor of Medicine on January 30, 1576/7. He was a Fellow from 1561 to 1569, when he appears to have vacated probably on marrying a widow by the name of Jane.

A dispute between him and John Marmyon of Ewelme, respecting the lease of a College farm was referred to arbitrators by the Privy Council, when at Woodstock in September 1577.[1]

College ledgers show that he was a tenant of a College house, and also acted as master of the almshouse; his duties being to open the door at all hours to the poor, to see to the 'beds, coverlets and sheets', to 'wasche honestlie all linnine as perteyneth to the church of the College', and to be responsible for the washing of table linen. For these duties he received a stipend of £4 13*s.* 4*d.* per annum.[2]

His will dated September 4, 1593, and proved October 27, 1608, is in the University archives. To his wife Jane he left 'his house and lease over against Madalen College;'

[1] *Acts of Privy Council*, vol. iv, 1894, pp. 23, 25.

[2] Ledger G. 1580–1592.

to his daughter he gave his lease and house in St. Mary's parish with all his land and goods, excepting his copyhold in Standlake, and his books; which last he dealt with as follows:

Item, I doe give all the rewe (sic) of bookes beginninge from Hippocrates and Goollen to the ende of the shelfe in my upper studie against St. Maries, my notebooks and writings excepted, to Magdalen College, conditionallie that they be good unto my wif and childe in performinge of the coppie hould over against Magdalen Colledge.

Of the 'rewe of bookes' left to the college there are now in the library the following which testify to the goodness of the college unto his 'wif and childe', and to the value of the gift. They also show the character of a medical library of the time. They are all folios or large quarto volumes, many containing more than one treatise. Unfortunately but few are in their original bindings, the rest having been rebound soon after their accession. They came to the college in 1601 and the accounts show that seventeen volumes (perhaps Gibbard's) were bound by one Middleton for *57s. 2d.* and thirty-nine were chained at a cost of *6s. 6d.*

1. [GADDESDEN, JOHN OF], Rosa anglica practica medicine, Ven., Bonetum Locatellum, 1516.
   RASIS, Ad Almansor, etc., pp. 1–109.
   MANFREDUS, HIERONYMUS, Centiloquium de medicis et infirmis, pp. 110–112, Ven., Jacobus Pencius de Leucho, 1508.
   MOYSES, RABY, Aphorismi, pp. 1–48, Ven., Jacobus Pencius de Leucho, 1508.
   CELSUS, A. C., Medicinae Liber, Ven., Joan Rubeus Vercellensis, 1493.[1]
2. CAULIACO, GUIDO DE, Cyrurgia, Ven., 1513.
3. THORER, A., De re medica (Soranus, Oribasius, Plinius, Apuleius, A. Musa), Basileae, 1528–9.
   AURELIANUS, COEL., Tardarum passionum, Basil., 1529.
   ORIBASIUS, D., Euporiston. Medicinae compend. Curationes. Trochiscorum confect., Basil., 1529.

[1] With MS. notes. An inscription suggests that the volume formerly belonged to Exeter College Library to which it was presented by Mr. Jones, M.B.—On a flyleaf at the end is this record of ownership: 'Codex Mri Joannis Rideri precium *7s. 4d.*' Early Oxford binding in stamped leather.

THURINUS, A., Opera, Romae, 1549.
LONICER, A., De Plantarum descriptione, Francofurt, 1555.
4. BARBARUS, HERMOLAUS, In Dioscoridem, Coloniae, 1530.
[BRUNFELS, O.,] In Dioscoridem historiam herbarum certissima adaptatio, Argent., 1543.
INDAGINE, J., Chiromantia, Argent., 1534.
5. DIOSCORIDES, De medica materia,
De letalibus venenis, Colon., 1529.
BARBARUS, HERMOLAUS, In Dioscoridem, Colon., 1530.
6. TACUINUS, Sex Rerum. With ALBENGNEFIT, De virt. Cib. and ALKINDUS, De rerum gradibus, Strasb., 1533.
TACUINUS, Aegritudinum et morborum, Argent., 1532.
SYLVIUS, J., Commentarius in Hippocratis elementa, Paris, 1548.
CRESCENTIUS, P., De Agricultura et Plantis, Basil., 1548.
7. MONTAGNANA, BARTH., Consilia de Balneis Patavĩ, Ven., 1535.
MATHIOLUS, JO., DE GRADI, Consilia, Lugduni, 1535.
8. ARCULANUS, J., Practica particularium morborum, Basil., 1540.
GATINARIA, M., Summi medici omnes.
ASTIARIUS, BLASIUS, De curatione febrium, LANULPHUS, C., De curatione febrium, AQUILANUS, SEB., De morbo Gallico, Basil., 1536.
MONTAGNANA, BARTH., De Balneis.
9. MARCELLUS, De medicamentis empiricis, Basil., 1536.
[————], Experimentarius medicinae (Trotula, Oct. Horatianus, Hildegard, Oribasius, Theodorus, Esculapius), Argent., 1544.[1]
BOSCO, J. J. MANLIUS DE, Luminare majus, Ven., 1520.
QUIRICUS DE AUGUSTIS DE TERTHONA, Lumen apothecarius, Ven., 1520.
10. CONSTANTINUS AFRICANUS, Opera, Basil., 1539.
11. BRASAVOLUS (ANT. MUSA), In Hippocratem et Galenum, Basil., 1541.
12. TORINUS, A., Paraphrases in A. Trallianum, Basil., 1541.
DODOENS, R., Histoire des plantes, Anvers, 1557.
13. Medici antiqui Latini, Ven., 1547.
FUMANELLUS, ANT., Opera, Tiguri., 1557.
14. SAVONAROLA, J. M., Practica major, Ven., 1547.
SAVONAROLA, J. M., Practica Canonica de Febribus (136 ff.), Ven., 1547.
SAVONAROLA, J. M., De Balneis (26 ff.), Ven., 1552.
OPTATUS, CAESAR, De Hectica Febre (19 ff.), Ven., 1552.
15. SERAPION, De Simplicium medicamentorum historia, Ven., 1552.
MYREPSUS, NIC., Medicamentorum opus, Basil., 1549.[2]
16. VALLERIOLA, F., Enarrationes medicinales, Responsio medicinalis, Lugd., 1554.[2]

[1] With marginal notes and additions to the index.
[2] With MS. notes.

RONDELET, G., De Piscibus, Lugd.., 1554.
17. WOTTON, E., De differentiis Animalium, Lutet., Paris, 1552.
RONDELET, G., De Aquatilibus, Lugduni, 1555.
BELON, P., L'histoire de la nature des oyseaux, Paris, 1555.
18. JUNTA, T., Scriptores de Balneis, Ven., 1553.[1]
19. FUCHSIUS, L., De componendorum . . . medicamentorum ratione, Basil., 1555.
DESSENIUS, B., De compositione medicamentorum, Francofurti, 1555.
20. De Chirurgia Scriptores,
Tagault, Haller, Sanct., Bologna.
Michel Angel, Galen, Oribasius, Gesner, Tiguri, 1555.[2]
21. GALEN, L. Fuchsius Interpret., Vols. i and ii, Paris, 1554.
22. GALEN, L. Fuchsius Interpret., Vol. iii, Paris, 1554.
FERNELIUS, JO., De abditis rerum causis, Paris, 1551.
SYLVIUS, J., De signis omnibus medicis, Ven., 1548.
SANCTA SOPHIĀ, GALEAT. DE, Opus medicinæ practicæ, Haganoæ, 1533.
23. ARGENTERIUS, J., De morbis, Flor., 1556.
24. MESUA, J., Opera, Ven., 1561.
HERCULANUS, J., De febribus, Ven., 1560.
25. MATTHIOLUS, P. A., Epistolæ medicæ, Prague, 1561.
BETUS, ANT. M., In quartam Fen Avicennae, Bononiae, 1562.
26. CORDUS, VAL., Annotationes in Dioscoridem, Argent., 1561.
CARDANUS, HIERO, Opuscula, Basil., 1559.
27. ARDOYNUS, S., De Venenis, Basil., 1562.
PONZETT, FERD., De Venenis.
TURISANUS, Plusquam Commentum in parvum Galeni artem, Venice, 1557.
28. VALVERDUS, J., Imagines partium corporis humani, Antw., 1566.
VESALIUS, A., De humani corporis fabrica, Antw., 1565.
CORNARIUS, J., in Ped. Dioscoridæ De Materia Medica, Basil., 1557.
RHEGINUS, G., Medicinæ exercitamenta, Lugd., 1564.
29. AVICENNA, Canones medicinæ, Basil., 1556.
30–33. GALEN, Opera, Vols. i–iv, Ven., 1556.

With the exception of three books, Budaeus *Communis lingua Graeca*, Christus a Vega *De arte medendi*, and R. Lully *Collectio*, the whole of the Gibbert bequest is still in the College Library.

Towards the end of the sixteenth century Sir Arthur Throckmorton was forming an interesting collection of standard works by French and Italian authors which he bequeathed

[1] With MS. notes. [2] With 'Nicolas Gibbarde' as signature inside cover.

to the College in 1626. Most of them appear to have been acquired about the time when Throckmorton is known to have been travelling abroad. He was at Padua on Aug. 2, 1581. There are not many scientific works in the collection, and several of these deal with science as applied to navigation and to the art of war, rather than with pure science. A copy of the *Del modo di fare le fortificationi*, Venice 1559, presented by the author Giac. Lanteri to his patron Alfonso da Este, Duke of Ferrara, is remarkable on account of the beauty of its binding, which was figured in the Catalogue of the Burlington Fine Arts Club in 1891.

While the first Fellows of the Royal Society were pursuing their researches in Oxford a few scientific books were purchased for the Library, and there is a note that in 1658 some Medical books were purchased of Robinson, bookseller. The *Philosophical Transactions* appear to have been taken from the start.

An accession of first-rate importance was **John Goodyer's** botanical library, which came to Magdalen in 1664, and is now one of the chief treasures of the Library. These books and manuscripts have more than any other collection thrown light upon the beginnings of Scientific Botany in England. But as they have already been listed and described at length,[1] there is no need to say more about them here. It is possible that the arrival of the Goodyer Library may have led to the acquisition of the large and elaborate work on the plants of the East, called the *Hortus Malabaricus*, published at Amsterdam in twelve volumes folio. They appeared in the College Library in 1678–1703, and were mentioned by John Evelyn in 1681. Scientific works of value were also being purchased out of the moneys given by **John Warner**, Bishop of Rochester. Books thus bought are inscribed with his name.

The arrangement of the Library was satisfactory, and fair to the interests of Natural Science. The old bookcases of the Library were like those at Corpus, much lower and in better proportion than the present ones. At least one special bookcase appears to have been devoted to science books. By

[1] Gunther, *Early British Botanists*, 1922.

the end of the eighteenth century Bookcase F. was labelled *Astronomia Physic.*, M. *Historia Naturalis*, O. *Historia Plant.*, and L. and N. *Libri Medici*, but after a great invasion of History and Theology books, many works on Natural Science were driven out of the main Library. After the close of the seventeenth century further acquisitions were not very numerous, and no adequate notice seems to have been taken of the great growth of science during the eighteenth century. But 'night and day successive come and go', and our greatest benefactor, **Charles Daubeny**, realizing how low the College stock of new scientific books had been allowed to get, formed a working library of his own. These he bequeathed to the College, where since 1867 they have been at once the inspiration of several generations of men, and the nucleus round which modern books have collected.

Daubeny's library was richest in treatises connected with the subjects of his various Chairs, Chemistry, Botany, and Rural Economy, of which only the Chemical section has come to the College. But we have his Geological books, which will always remain of interest to any worker who may traverse the special fields in which Daubeny's work lay. His works and tracts on Volcanoes, his records of the analyses of Mineral Waters, with books of several other categories have a lasting historical value, on account of the ever-changing nature of the phenomena recorded in them, and their value is enhanced by the geological specimens on which they were based, and which should be available for study in the Daubeny Building.

A catalogue of the books was printed, and some of them remained for a space of time over the Laboratory in an upper room, as indicated in Daubeny's Will. But for the convenience of readers the greater number were moved to the shelves specially erected for their reception in the Reading Room next the Library, long used as a Summer Common Room. Many will remember the remarkable scheme of decoration of this room, its curious gilt-brass chandelier with much foliage, the heavy dark red wall paper, and presiding over the mantelpiece a small portrait of the little doctor in spec-

tacles, which in certain lights was strangely silhouetted against a varnished background. It is beyond doubt that the success of the Science school at Magdalen has been largely due to the nature and accessibility of the Science Library bequeathed by Dr. Daubeny and to its having been kept up to date.

A special collection of Medical Books was left to the College in 1871 by Frederick Symonds.

The Study of the History of Science in Oxford.

The history of Science has been increasingly studied during the last few years. It is a study to which several Magdalen men have given their attention, and one for which materials of first-class importance have been placed in the custody of the College, some being specially safeguarded under the terms of the Daubeny Trust.

Dr. Daubeny had had a Winchester education, but his interests did not remain exclusively classical, and all his writings show him familiar with the wider applications of Latin and Greek. His lectures were the lectures of a man of a scholarly mind; and he well understood the art of including in them the results of his own original researches. He appears to have been the first member of the College to realize the importance of the History of Science. He described the *Botanical MS. of Dioscorides*; he lectured on the *Husbandry of the Romans*; he published *Essays on the Trees and Shrubs of the Ancients.* The historical introduction to his *Guide to the Botanic Garden* was a short résumé of Botanic Studies in Oxford, and his Chemical Lectures were full of references to early authorities. Daubeny was followed by his pupil Dr. Payne, the well-known authority on *Anglo-Saxon Medicine* and on the History of Medicine generally, who in the Easter Term of 1909 gave six lectures at Oxford on the *History of Greek Medicine up to the age of Hippocrates.*

In more recent times Francis Gotch lectured on aspects of the Scientific Method in History (1906) and produced a notable study of the work of *Two Oxford Physiologists, Richard Lower* and *John Mayow* (1908).

Gunther, following in Daubeny's footsteps, again reviewed the history of Botanic Studies in Oxford in his *Oxford Gardens*, 1912, while the periods of Morison, Bobart, and Dillenius have been treated more fully by Vines and Druce. The discovery of the importance of the Goodyer manuscripts and books in the College Library gave fresh impetus to the study of the History of Botany and Horticulture of a period that had previously been neglected through lack of materials. Their critical examination and rearrangement has revived the memory of many forgotten Botanists whose work, although already a century old at the time of Linnaeus, would have elicited his admiration had he been acquainted with it. The story of English scientific botany has been traced back beyond its previous limits.

And last, but not least, in this enumeration of historical studies by Magdalen men, come the very varied and interesting series that have been undertaken by Dr. Singer, and by those whom he has associated with him. These will be described below in connexion with the Singer Science Room.

Meanwhile, the menace of War in the Air came so close to Oxford and to her valuable and irreplaceable collections, that it became a duty to prepare a photographic survey of our unique scientific historical treasures, so that, if perchance a misdirected bomb should destroy the originals, there might be some record of their existence.

A beginning was made with the zoological types in the Tradescant Collection, which are still practically unknown to Science. From these the work spread to the whole of the early Scientific equipment of the University. The Daubeny Building, as usual, was invaluable as a repository for the photographic negatives and materials, as they accumulated and awaited publication. And in the course of the survey the early chemical glass and other apparatus of value that had been bequeathed by Dr. Daubeny was photographed and described.

When the idea of a Science Museum to illustrate the progress of scientific studies in Oxford was promulgated about 1916, the author approached the Delegates of the University

Press on the subject of a catalogue, but, doubtless owing to circumstances arising out of the War, the Secretary to the Delegates reported that it was quite impossible for the Press to undertake the publication of the work on the scale then contemplated. But this may be part of a general policy, which has had the result that of none of the Oxford Collections in the Oxford Museums is there a printed catalogue.

The occasion of the tercentenary of Elias Ashmole on May 23, 1917, provided another opportunity for considering the attitude of Oxford to scientific historical studies. Ashmole had been a student of all the sciences of his day—physics, mathematics, astrology, botany, chemistry, and anatomy. He acquired the historic collections of the Tradescants, added much of value to them, enriched them with a priceless library of Manuscripts and presented all to Oxford, where he has been justly honoured as the Founder of the first public Museum of Natural History in Britain. He also founded the first Chair of Chemistry in the University. On this last occasion of the centenary of Ashmole's birth, Ashmole as a man of science was wholly ignored. The celebration was confined to the alleged 'threefold Oxford interest in Ashmole' represented by the Visitors of the New Ashmolean, the Curators of the Bodleian, and Brasenose College, none of them scientific bodies.

The Museum, built for Ashmole's scientific collections, where a banquet had been given for him, was practically omitted from the celebration programme, as were also his natural history collections. Consequently protests came and suggestions that 'the best way to celebrate the Founder of the first public Museum would be to restore the Tradescant and Ashmolean collections to the Ashmolean Building, from which they should never have been removed. They should be kept as a unique example of a museum of the seventeenth century. Thus would Oxford be established in her rightful and unique heritage of being the proud possessor of the oldest Library, Botanic Garden and Museum in the world. And they are not only old, but world-famous.'[1]

[1] 'The Tercentenary of Ashmole', *Oxford Magazine*, 21 May 1917. Cf. also *Nature*, 17 May 1917.

Little attention was paid to this proposal at the time, but when two years later my friend Lewis Evans communicated to me his intention of offering his magnificent collection of early scientific instruments to the University, the above suggestion, with the approval of many people in Oxford, was repeated in a letter to *The Times* on November 28, 1922. Whereupon it was intimated by the Keeper of the new Ashmolean Museum of Art and Archaeology to our intending benefactor, who was offering what is unquestionably the finest representative collection of instruments in England, (1) that his instruments had not the antiquity that he pretended and that (2) many had been made by his grandfather![1]

After much delay the question of the acceptance or refusal of the Evans Collection was brought before the University, and on March 4, 1924, a Decree of grateful acceptance was passed, the two upper rooms in the Old Ashmolean Building being allotted for the permanent exhibition of the collection. Its suitable display will materially advance the study of the Archaeology of Science; and in this respect it is well worth repeating the opinion expressed by the Royal Commission of 1919–22 who reported that it is advantageous for research and advanced students of *archaeology* to have a place where they 'can work among books, learned periodicals, maps, photographs and casts, and in congenial surroundings', and they state that in the interests of Classical studies, 'it is imperative that further support should be given to the existing Archaeological and Art Museums at both Universities', but the Commissioners left out of account the needs of those who study the History of Science in Oxford.

Thus has a building that was actually built as a Science Museum come to be restored to its ancient use.

Science Rooms in Oxford.

Books and instruments are not always compatible, but in some cases their close association is a necessity. The early founders of Libraries undoubtedly intended their books and scientific instruments to be kept together. This was the

[1] Dr. Hogarth's Letter in *The Times*, Dec. 2, 1922.

intention of the astronomer William Rede, *c.* 1325–85, when he built the great library at Merton College; his example was followed by Sir Thomas Bodley, who endowed his library with an armillary sphere, a magnificent quadrate, and with other scientific apparatus. Bodley's care for scientific studies is also shown by the lists of medical works added to the catalogue in 1605 'by his special desire'. He evidently considered navigational instruments to be necessary in Oxford to his 'ark to save learning from deluge'.

The need of a Science Room in close proximity to the great University Library has been felt at all times, the want has been met in various ways, and sometimes been defrayed by the scientists themselves. But sooner or later the accommodation provided has been reft from the service of Science to be consecrated to other purposes, so that the workers of the next generation have been in the position of having to begin the struggle all over again. We have several instances of this in the history of Oxford.

When the teaching and progress of the natural sciences came to be based upon material objects, and on observations rather than on books, separate rooms for such studies became necessary. One of the first of these Science Rooms was the apartment for the books, instruments, and persons of the Professors of Astronomy and Geometry. It was known as the 'Savile Study', and from about 1619 to 1834 was situated over the entrance under the great tower of the Schools. Its utility was unquestioned. Its instruments were listed in the Bodleian Catalogue of 1697. Wren and Wallis contributed their mathematical and astronomical libraries to the books already there, and, had it remained accessible, it would be a boon to the historian of the sciences for which it was designed. In 1834 Convocation sanctioned the eviction of these MSS. books and instruments from the Savile Study on condition that a small room in the adjoining south-east angle of the quadrangle should be prepared at the expense of the Bodleian in substitution for the original 'Savile Room'. This Science Room was in its turn incorporated in the Bodleian in 1884.[1]

[1] Macray, p. 329.

A second Science Room of early date—perhaps as old as the Bodleian—was the Anatomy School. It survived as a repository for much that was interesting or rare till near the close of the eighteenth century. The possession of the key was a perquisite of value, a sure sign of the popularity of the contents.

How Sir William Osler would have revelled in the examination of those anatomical preparations, direct from the hands of the anatomists of the seventeenth century! Surely there would have been evidence of the work of Willis and Lower, possibly of the immortal Harvey himself. But the Bodleian Librarian of the day coveted the room. Being a literary man he described the contents as 'heterogeneous and gruesome', and in 1789 fitted it up for Greek and Biblical MSS., a transformation that was paralleled in 1923 by the peaceful penetration of Theology into the Daubeny Building, and the part eviction of Science therefrom.

The success and need of these early Science Rooms is shown by the fact that a third block of Science Rooms was built by the University in 1679–83. The learned world had been impressed with the importance of the epoch-making researches of the first members of the Royal Society in Oxford. These researches had been carried on in College rooms, or in lodgings not well adapted for the purpose. The need of a suitable building had long been felt and often discussed. An offer of scientific collections of value by Ashmole was the stimulus for the provision of a Scientific Institution where historic collections and books could be housed in the closest proximity to a laboratory and a room for meetings. Its endowment was very scanty, nevertheless the Old Ashmolean Museum continued for two hundred years, and in the nineteenth century produced three offspring: the Daubeny Laboratory at Magdalen in 1847, the New Museum of Science in the Parks in 1860, the New Ashmolean Museum of Art and Archaeology in 1892.

None of the daughter institutions appears to have cherished much affection for the parent, or to have contributed to her maintenance in old age. But none of them has been as un-

filial as the New Ashmolean Museum of Art and Archaeology, which has not only deprived the venerable parent of her Statute, but has now tried to steal for herself the exclusive use of her time-honoured name. Indeed in 1891 the then Keeper of the Ashmolean was proposing that the empty shell of the mother-building might be passed on to the Bodleian Library[1] as soon as the University had provided the heavy sum necessary for a new Museum in which to illustrate the ancient civilizations of the Mediterranean basin. This last object had many sympathizers in Oxford, but it was hardly within the duty of a Keeper of the Museum which Ashmole had founded for illustrating the History of Natural Science. So by 1894 Ashmole's scientific instruments had been removed to the incongruous surroundings of an Art Museum, where their use was forgotten, while Ashmole's own Scientific books and MSS., which might have helped in their elucidation, had been removed to the Bodleian Library.

At the present time Science again has need of the upper part of the Old Ashmolean building, and, thanks to a recent Decree in Convocation, is likely soon to re-enter its ancient abode.

A fourth, and still more magnificent, Science Room was begun in 1737 through the munificence of Dr. Radcliffe. It was especially constructed for a Physic Library, and ranks high among the noble foundations for Science. It housed the Radcliffe scientific books for ninety years, from 1749 until the day that Sir Henry Acland procured the withdrawal of its contents to his New Museum in the Parks.

As the space at the disposal of the Bodleian gradually became more and more filled with the 'baggage books' that now choke the 'all-devouring Library', the cry was for space, and yet more space, so that in 1852 the Radcliffe from having been a reserve for Scientific studies became a general reading-room, and the whole building was finally made over for all purposes in 1861. The Schools of Geometry and Medicine were annexed to the Library in 1828. The basement of the Old Ashmolean, which had been the First Chemical Laboratory of the University, was conceded about 1893, and the great and

[1] E. W. Nicholson, *Council, Lady Chantrey and the Bodleian*, Oxford, 1896.

all-devouring Library is branching into such a variety of rooms and buildings, which were built for quite other purposes, that economical management will be an insuperable problem. The net result of these various moves and changes of policy has been that by the end of the nineteenth century Oxford was absolutely without any central repository for her historical scientific instruments, without any special provision near the Bodleian for the needs of students of the history of science, and the scientific reader is deprived of conveniences which his benefactors intended him to have. Faculty rooms, that were provided for him in the past, have been used for other subjects.

In 1914 the story began all over again. With the approval and through the intercession of Sir William Osler, Dr. Singer of Magdalen College, and his collaborators were granted by the Librarian and the Curators of the Bodleian Library the use of a bay in the gallery of the Radcliffe Camera (= 'the Physick Library' of 1737), as a special 'Science Room' for studies in the History of Science. For this privilege Dr. Singer paid to the Library the large sum of five hundred pounds, paid in five annual instalments from 1914 to 1918. So £500 may be called the endowment of the Science Room of 1914–18, Dr. Singer being the donor.

Sir William Osler reported that the experiment was a conspicuous success.[1] That 'ten special students have used the room. Professor Ramsay Wright has made a study of an interesting Persian medical manuscript. Professor William Libby, of Pittsburg, during the session of 1915–16, used the room in the preparation of his admirable *History of Science* just issued. Dr. E. T. Withington, the well-known medical historian, is making a special study of the old Greek writers for the new edition of Liddell and Scott's *Dictionary*. Miss Mildred Westland has helped Dr. Singer with the Italian medical manuscripts. Mr. Reuben Levy has worked at the Arabic medical manuscripts of Moses Maimonides. Mrs. Jenkinson is engaged on a study of early medicine and magic. Dr. J. L. E. Dreyer, the distinguished historian of Astronomy,

[1] Osler, *Preface* to Singer, *Studies in History of Science*, 1917.

has used the room in connexion with the preparation of the *Opera Omnia* of Tycho Brahe. Miss Joan Evans is engaged upon a research on mediaeval lapidaries. Mrs. Singer has begun a study of the English medical manuscripts, with a view to a complete catalogue. How important this is may be judged from the first instalment of her work dealing with the plague manuscripts in the British Museum. With rare enthusiasm and energy Dr. Singer has himself done a great deal of valuable work, and has proved an intellectual ferment working far beyond the confines of Oxford. I have myself found the science history room of the greatest convenience, and it is most helpful to have easy access on the shelves to a large collection of works on the subject. Had the war not interfered, we had hoped to start a *Journal of the History and Method of Science* and to organize a summer school for special students—hopes we may perhaps see realized in happier days.'

And to these must be added the name of our great Regius Professor of Medicine himself. Unhappily for Oxford, indeed for the whole world of Science, he did not live to see the fruits of these early labours. Shortly after the publication of the first volume of *Studies in the History of Science*, Dr. and Mrs. Singer, to our great loss, left Oxford for London. The Science Room he had founded was closed down, and a large balance, nearly £250, contributed by him, was left in a special Fund. It is to be hoped that it will be available in the future, when a Science Room is again established at the Bodleian.

In 1921 Dr. Singer[1] noted that 'among the many recent signs of public interest in this country in the History and Philosophy of Science special note must be made of the systematic course in the subject now organized at University College, London. The work is under the general direction of Dr. A. Wolf. Professors Sir William Bragg, Flinders Petrie, W. M. Bayliss, L. N. G. Filon, J. P. Hill, F. G. Donnan, E. J. Garwood, T. L. Wren, D. Orson Wood, and the Editor of this series are taking part in it. The course at Edinburgh in the History of Medicine, initiated by Dr. J. D. Comrie, has attracted a large and annually increasing number of students.

[1] Singer, *Studies in the History and Method of Science*, 1921.

Mr. A. E. Heath, Senior Lecturer on Education at Liverpool University, is giving systematic instruction there on the History of Science, and the Editor of this series has become Lecturer in the History of Medicine at University College, London, and University Lecturer in the History of the Biological Sciences at Oxford. Great service has been rendered by Mr. F. S. Marvin, who has not only done much to popularize the History of Science, but has sought to integrate this important aspect of human development in the historical instruction of schools.'

'Considerable literary activity is also being exhibited. The English translation of Aristotle under the general editorship of Mr. W. D. Ross has continued to appear, as has also the much-needed publication of Roger Bacon's works under the editorship of Mr. A. G. Little, Mr. Robert Steele, and Dr. Withington. Sir Arthur Hort has rendered the *History of Plants* of Theophrastus into English, and a similar service has been done for Galen's short treatise *On the Natural Faculties* by Dr. A. J. Brock. A valuable work in a different department is Sir Norman Moore's monumental and learned *History of St. Bartholomew's Hospital.*'

'All historians of science look forward with lively interest to the appearance of Sir T. L. Heath's *History of Greek Mathematics*, Professor Dobson and Mr. Brodetsky's version of Copernicus, Mr. W. H. S. Jones's edition of Hippocrates, Professor William Wright and Mr. Foate's translation of Vesalius, and to further communications from the pen of Dr. J. K. Fotheringham, whose work peculiarly illustrates the aid rendered to modern scientific investigation by a wide and deep knowledge of ancient science. Less conspicuous but very real and useful will be the results of the tireless devotion which Dr. Withington has for many years bestowed on the vast mass of Greek scientific literature, with the object of rendering the forthcoming edition of Liddell and Scott's Greek Lexicon more complete in what has been hitherto a somewhat neglected department. It is a legitimate hope that his unique experience may now be utilized in rendering accessible to English readers the more important works of Galen.'

'A central institute and library, devoted to the promotion of systematic investigation into the historical documents of science is greatly needed in this country. Such a foundation would do much to place the subject on its proper academic basis and would rapidly react on the whole system of scientific education. It would help the teacher to present the sciences in their evolutionary relation to each other and to the course of history as a whole. It would especially help the teacher of science to develop his subject as the product of a progressive revelation of the human spirit rather than as a mere description and attempted explanation of the phenomena. We may well look to this new orientation of scientific teaching to counteract the effects of the regrettable but real decline in the study of the older "humanities".'

To Dr. Singer's account we may add that the subject of the History of Science has been accorded a place in the best modern general Histories—such as the *Cambridge History*, or the *Introductory History of England* by C. R. L. Fletcher Fellow of Magdalen. And special text-books are increasing in number every year.[1]

[1] Schuster and Shipley, *Britain's Heritage of Science*; Sedgwick and Tyler, *Short History of Science*; Osler, *Evolution of Modern Medicine*; Salzman *English Industries of the Middle Ages*; Hart, *Makers of Science*, &c.

BIOGRAPHICAL NOTES.

Henry Edward Fowler Garnsey.

Demy 1846; Fellow 1851–1903.

Henry Garnsey lived to be one of the last of the Life Fellows on the old foundation. For a time he had done duty as Usher at the School, but he is best remembered as a student of botany. I have before me his own account of his early appearance in College.

'On July 22 or 21, 1846 I stood at the right hand of Dr. Routh and construed the Odyssey to him in the Hall, when he must have been some way beyond ninety years of age. I quite agree with you in liking quite what I have seen of Prof. Miers . . .' *Letter* of July 1896.

Although not a professional botanist, Garnsey took charge of the University herbarium at the Botanic Garden at a very critical time, when the cult of 'higher' (?) studies by Professor Lawson had been accompanied by the greatest neglect of the historic collections of dried plants. There was then no official curator of the herbarium, and if Garnsey had not perceived the mischief in time, and had not gone carefully through the dried plants, the historic Oxford collections would have been far less valuable than they now are. He will always be remembered by his translations of German botanical text-books which he doubtless undertook at the request of Prof. Bayley Balfour. They included

K. Goebel, *Outlines of Classification and special Morphology of Plants.* 8vo, Oxford, 1887.

A. de Bary, *Lectures on Bacteria.* 8vo, Oxford, 1887.

,, *Comparative Morphology and Biology of Fungi, Mycetozoa and Bacteria.* 8vo, Oxford, 1887.

J. von Sachs, *History of Botany.* 8vo, Oxford, 1889.

Count H. zu Solms-Laubach, *Introduction to fossil Botany.* 8vo, Oxford, 1891.

By this work he advanced the cause of true learning more than any of his contemporary Fellows.

In character he was shy and retiring, but though he avoided College functions, he liked to hear about them. In 1896, he wrote, 'I am glad to read what you say of the Gaudy, for though I fail in my duty to it, I always am very desirous that it should be a pleasant and satisfactory gathering. . . . I have been scolded (very kindly) since Wednesday last for not making the fact known that it was the completion of my 50th year of membership in the College; I do not know that I concealed the fact so much as did not reveal it; for I did not feel equal to the possibilities if I had done so, and in a matter so personal to myself was glad to be spared.

Towards the end of his College life his constitution did not permit him to attend Common Room, with the result that those who did wove many pleasant and unpleasant tales at the expense of their absent colleague. But he alone of all will be remembered through his benefaction for reproducing the original oak-roof in the College Hall. The style and proportions of his new roof were from designs which Prof. T. Case maintained to be on the original lines. It was the privilege of the present writer to be able to confirm the truth of Prof. Case's restoration by finding the scars of the principals of the old roof on the end walls, marked out by ancient plaster. The scheme of decoration of the roof is the work of Mr. Bodley, who in the proportions of the arched braces departed far from those of the original roof.

Thomas Henry Toovey Hopkins.

Demy 1853–6; ordained Deacon 1858; Bursar 1862–5, '69, 81–5; Curator of the University Chest 1883–5, of the Parks 1862–5; Delegate of the University Police 1873–85; died, Sandown, I.W., 26 Aug. 1885.

In an appreciation of the fine character of Toovey Hopkins the President (*Oxford Magazine*, 21 Oct. 1885) has described the all-round excellences, and especially the thorough practical knowledge which made him such a pillar of strength as College Bursar, as Curator of the Parks, as Delegate of the water-police, and in many other ways, as well as on the river, and in workshop and laboratory.

Toovey Hopkins had attended the Chemical Lectures which Dr. Daubeny was accustomed to give to members of the College and others, in his Laboratory long after he had resigned the Chair of Chemistry. These Lectures became 'Catechetical' at the beginning of October term 1855, and were continued for him by Hopkins and others when he was obliged to exchange the Oxford climate for that of Torquay in the winter months. After Dr. Daubeny's death, Hopkins continued to work in the Laboratory and to interest himself more especially in the keeping of the Meteorological Record, actually printing a summary of the Annual Rainfall for 1860–1865 with his own hands on a small Holtzapffel printing press. He is therefore the only Fellow of Magdalen who is known to have composed, printed, and circulated his own works.

His skill in the mechanical arts was quite of a peculiar order, and a barometer stand and an ivory match box (since stolen from the Senior Common Room) and set of draughtsmen long remained in College as evidence to his craftsmanship. At his death many of his lathe tools and pieces of work were given by his brother, Admiral Hopkins, to Edward Chapman, who bequeathed them to me. It is therefore my pleasurable duty as an admiring fellow-craftsman, though of far humbler pretensions, to contribute a few notes on his work as an ornamental turner.

He kept his lathe in the attic over his rooms in the New Buildings on No. II Staircase, and several old Magdalen men have told me of the pleasure it gave them to watch him at work and to hear him explain the use of his various contrivances. Macray (*Reg.* vi, p. 163) has referred to his skill in carpentry and carving. But although I have seen much of his work both finished and unfinished, I have not seen any specimen of his carving, and do not believe that he was a carver, in the sense that he was a turner. On the other hand Llewellyn Meyrick, who occupied the rooms opposite, decorated his furniture and mantelpiece (sold by the College at the request of C. H. T. later) with elaborate carvings. If for 'carving' we read 'ornamental turning', we shall render a truer tribute to the memory of Toovey Hopkins. For in

this he excelled, as I have had exceptional opportunity of knowing. His work compares exceedingly well with the work of some of the best of his seniors and contemporaries, master-amateurs of the Art. Among these may be mentioned Sir Charles Taylor, to whose lathe I had previously succeeded, Sir Thomas Bazley, the author of 'Notes on the Epicycloidal Cutting Frame' and 'The Index to the Geometric Chuck', and father of the late Gardner Bazley, commoner of Magdalen. Hopkins's work may also be compared with the highly finished productions of Francis Barrow, whose high traditions of work, more especially with Atkinson's Reciprocators, have been well maintained by Dr. Edward Stainer, Demy and godson to Edward Chapman; and also with the work of my friend Thomas Harcourt Powell of Drinkstone, sportsman and practical photographer and mechanic who was second to none in his day—all of whom were Members of the Amateur Mechanical Society, whose Journal was published regularly between 1871 and 1879. As fellow-craftsmen, of a somewhat lower grade, were Edward Chapman and his Cheshire neighbour John Arthur Sidebottom, the ingenious though somewhat rough adapter of medallion-turning to cylindrical surfaces. Hopkins's best work, or as Harcourt Powell would have called it, his 'Sunday work', for beauty and truth was equal to any of theirs. Like his own motto, it was *Inter Primos.*

But there is also professional testimony as to his work. I have before me a letter by Mr. J. H. Evans, whose name used to be better known to Ornamental Turners than any other, except that of Charles Holtzapffel, in which the following appreciation occurs:

'Mr. Hopkins' name has been associated with, I may say, the whole of my business career, as I have known him from my days of apprenticeship when he used to come very often, always with a kind word and good wish for everyone. . . . As an Amateur Mechanic Mr. Hopkins was far above the average and his work was in many cases equal to professional productions. As an inventor of various instruments connected with ornamental turning he was extremely ingenious: several of

his ideas I carried out for him, which were successful in all ways. Under extreme pressure of business I asked him once to divide a plate for me, which it is needless to say he did most willingly and in such a manner that no one could have done it better. . . . I unhesitatingly say that a more gentle and better man, a truer friend, and able mechanic I never knew.'

Mr. George Holtzapffel, of 53 Haymarket, London, has been kind enough to write me an account of how Hopkins furnished his attic workshop in the New Buildings of Magdalen. 'I have been through our books and I find that Mr. T. H. T. Hopkins commenced by purchasing a Lathe head only, in November 1860. Then he added a frame and the other heads, and subsequently slide rests, cutting frames, ornamental chucks, tools, &c., until by the time the account was closed in April 1885 he had a very good and fairly complete outfit. He also purchased a Saw Machine, a Grinding Machine, Tripod Vice, Carpenter's Bench, &c. &c. With the exception of the water gauge and float which we made in December 1876, I cannot find that we ever made any special apparatus for him, though we made a good many small cutters and bits. We seem to have sent him castings made from his own patterns, and brass, iron, and steel from time to time. I have the weights but no record of the purposes for which these were required. After Mr. Hopkins's death the Lathe was sent us to dispose of and it was sold in January 1888. I am sorry I can give you no information about the cutting frame.'

He did not publish much, but some of his work may be studied in plates entitled 'Specimens of Ornamental Surface Turning' executed by the Rev. T. H. T. Hopkins, M.A., Oxon.[1]

The figures 'were entirely produced with printers' ink and the usual printers' appliances, and worked by printers, which leave nothing, so far as clearness is concerned, to be desired'.

[1] *The Forge and Lathe*, p. 278 and Pls. I and II, No. 17, n. s., 1878.

The following letter was written by him to Chapman at Mentone, when he was taking charge of the Daubeny Laboratory and of the Weather Record. The wind had been NE. or ENE. during the greater part of the week, and they had had ·01, ·03, ·02 inches of snow on the 25, 26, and 27 of March.

March 27, 1879.

My dear Chapman,

You must, from your letter, be very hot and uncomfortable. However make the best of it; it may get cooler by and by. It has not snowed here to-day. I don't know why—there must be some mistake about it. Fisher says I am to tell you that he has not yet promenaded in your carriage but is thinking of swelling round the Stingy Drive on Rupert, with Stephen in attendance, on the other horse. We got through Collections on Monday. Mr. Chitty as usual came in for a certain amount of rebuke, as did Messrs. Cholmeley and Hewlett, but on the whole we had rather a mild performance. Smalls have been horribly fatal this time—a regular massacre of the Innocents. We have given our Statutes the final rub up for the Commissioners, and that pretty well ends the Term's work. I am ½ thinking of going down to Tregenna Hotel next week, but am not at all decided about it. The weather will have considerable weight in influencing my movements. Old John [Harris, the Laboratory Assistant] has a slight attack of his enemy. He is better but cannot get a leather shoe on yet. The chances for the boat-race do not look very bright at present. They have turned one of our men (Wells) out to make room for Marriott, who will of course make some difference in the going of the boat. Best remembrances to Mrs. C.

Believe me to be,
Yours ever truly,
T. H. T. Hopkins.

As this letter shows, the interests of College rowing were always uppermost in his mind. Oft-times, when the floodwaters were running strongly, he would invite some member of the

College to go out rowing for the sheer delight of the exercise, and of seeing how far they could get down the river. It was therefore appropriate that after his early death his love of good rowing should be commemorated on the river. At a Meeting of Members of the College held in the Hall on Jan. 31 1886 it was provisionally agreed that the Memorial to Hopkins should take the form of a College Barge. A subscription was raised and a barge was built, which, we are happy to think, is the one that after the lapse of close on forty years is still afloat.

> THIS BARGE WAS PRESENTED TO THE MAGDALEN COLLEGE BOAT CLUB BY FRIENDS OF THE REV^{d} THOMAS HENRY TOOVEY HOPKINS AS A MEMORIAL OF SUPPORT GIVEN BY HIM FOR NEARLY THIRTY YEARS TO ROWING IN THE COLLEGE.

He would have rejoiced to know that during the whole of this long period the College VIII has never been below the third place and has been Head in twelve years. Hopkins died at Sandown in the Isle of Wight.

But an even more enduring monument to his practical services to Magdalen is the fine Fellows' Walk leading from Addison's Walk to Mesopotamia along the further bank of the Cherwell. The older trees are of Hopkins's planting, and, more important still, the position of St. Swithun's buildings standing back from the High Street. Had it not been for him, these buildings would have been nearer to the street, if not actually on it.

> Collegio vero praecipue servire pro virili semper laborabat.
>
> *V. P. Reg.*

Joseph Frank Payne.

Although Dr. Payne's name does not appear in the lists of those who attended Dr. Daubeny's Lectures, yet it is very probable that, like many others, he did, and did not enter his name. His record was: Elected Demy in Natural Science 16 Oct. 1858; I Class in Natural Science, 1862; Burdett-Coutts Scholarship, 1863; Fellow, 24 Oct. 1863–83; Radcliffe Travelling Fellow, 1865; M.B., 1867; F.R.C.P., 1873; M.D.,

1880; British Medical Commission to investigate the Plague in Russia, 1879; Member of the Royal Commission on Tuberculosis, 1890; Librarian of the Royal College of Physicians; President of the Dermatological Society of Great Britain, 1892–3; of the Epidemiological Society, 1892–4; of the Pathological Society, 1897–8; Fellow (for life) of the University of London, 1899, and Member of the Senate, 1899–1906; Oxford Representative on the General Medical Council, 1899–1904; Honorary Fellow of Magdalen College, 1906; Died, 16 Nov. 1910.

Edited Lectures on the history of Education by his father Prof. Joseph Payne, 1870.

Cases illustrating diseases of the liver and peritoneum. *Trans. Pathological Soc.*, 1870.

Joint Editor of *Quarterly Journal of Microscopical Science*, 1872.

On Students' Microscopes. *Q. J. Micr. Sci.*, 1872.

Manual of Pathological Anatomy. 8vo, London, 1875.

Facsimile reprint of Linacre's Latin translation of Galen's 'De Temperamentis' 1521. 1881.

Observations on some rare diseases of the skin. 8vo, London, 1889.

Edited Boghurst 'Loimographia', an account of the Great Plague of London in 1665. *Epidemiological Society*, 1894.

Edited Nomenclature of Diseases, publ. by the Royal College of Physicians, 1896.

Harvey and Galen; the Harveian oration for 1896. 8vo, London, 1897.

Life of Thomas Sydenham. 8vo, London, 1900.

On the 'Herbarius' and 'Hortus Sanitatis'. *Bibliographical Society*, 8vo, London, 1901.

English Medicine in Anglo-Saxon times, being the Fitzpatrick lectures for 1903. 8vo, 1904.

Notes to accompany a facsimile reproduction of the Diploma of Doctor of Medicine granted by the University of Padua to W. Harvey in 1602. With a translation. Privately printed in 8vo, London, 1908.

Obituary notice. *Times*, 18 Nov. 1910.

Sale Catalogue of his Collection of Early Medical Works. London, 1911.

Dr. Payne told the writer that as a young Fellow he resided in one of the upper rooms over the Daubeny Laboratory, there being no other rooms then available in College.

Charles John Francis Yule.

1848, 23 March. Born, *s.* of Capt. Yule, R.N. (Plymouth).
1863 Apr.–1867. Educated at Magdalen College School.
1868, 27 Jan. Matriculated at Balliol College as a Scholar, aged 19.
1869. Migrated to St. John's College, Cambridge. (Scholar there, 1872.)
1872. I Class Nat. Sci. Tripos; B.A.
1873, 18 Oct. Fellow of Magdalen College, after exam. in Natural Science; Tutor in Nov. '73.
1874, 24 Dec. M.A.
1876. Paper on *Urari.*
1877–84. College Offices: Jun. Dean of Arts, '77–8; Jun. Bursar, '78; Vice-Pres. '81–2; Sen. Dean of Arts, '83–4; Pro-proctor, '83.
1878–9. Examiner in Nat. Sci. Tripos, Cambridge.
1884, 19 Oct. Resigned tutorship in Natural Science.
1885, 31 May. Ordained Deacon; 20 Dec., Priest; Curate of Alcester, 1885–9.
1889–92. Vicar of Horspath.
1892–1900. Vicar of Ashbury, Berks.
1905. Died Feb. 10, aged 56; buried at Shipton-on-Cherwell.

To Charlie Yule, as his friends used to call him, the University owed the introduction into Oxford of the first courses of instruction in Practical Physiology on modern lines.

In his student days he greatly benefited by circumstances that caused him to migrate from the old-fashioned lectures and demonstrations of the Oxford curriculum to Cambridge. The time was propitious. A few enlightened persons had become aware of a gradual upgrowth of new branches of science, in which the old Universities were taking little or no part. Physiology was one of these. About the beginning of Yule's second year at Cambridge, Trinity College founded a Praelectorship in Physiology, and elected Michael Foster first Praelector. During the earlier part of that year (1870) Foster, with Ray Lankester and Rutherford, had been Demonstrator for Huxley in the latter's first biological course, held in the old Patent Museum at S. Kensington. Subsequently,

the new Praelector returned to Cambridge full of his great master's enthusiasm and methods of teaching; moreover, he was further prepared by having spent part of the preceding long vacation in Germany, accompanying his teacher, Professor Sharpey, on a tour of inspection of Physiological Laboratories, for the purpose of studying the methods of instruction adopted in them.

The primary idea of Foster's teaching was that scientific instruction, if it is to have lasting value, must be based on first-hand knowledge; a student must see and do things for himself. One of Foster's pupils writes: 'the majority of the small band who attended his lectures during the first three years adopted a scientific career'—Gaskell, Frank Balfour, Langley, Liversidge, Milnes Marshall, and, later, Sedgwick and Vines. That was the atmosphere of biological Cambridge when Yule was an undergraduate. Yule obtained a First Class; and the verdict of the Tripos Examiners has been confirmed by Michael Foster himself, who on several occasions has told me, that he regarded Yule as one of the ablest of his early pupils. It was therefore not surprising that Yule in a competitive examination for a Fellowship at Magdalen was successful in 1873.

And then history repeated itself. Just as at Cambridge the first step towards the better teaching of Physiology came not from the University but from Trinity College, so in Oxford the new teaching of the science of Physiology was rendered possible by the existence of the Daubeny Building and the broad-mindedness of Hopkins and Chapman. Yule, thanks to the circumstances we have just described, was able to arrange a course of instruction in practical Physiology, which was far in advance of the physiological courses of contemporary medical schools, and still seems so essentially modern in character that it would serve in a medical school at the present day. In its main outlines it illustrated Burdon-Sanderson's *Handbook of the Physiological Laboratory*, which had only recently been published.

In this connexion it is only fair to Yule to quote a sentence, referring to the Physiology Course at University College in

London, written by Professor Gotch in his obituary notice on Burdon-Sanderson and printed in the *British Medical Journal* for Dec. 2, 1905:

'The course of practical exercises in Physiology, published in 1880 and enlarged in 1882, was the first work of the kind, not in England merely, but in any country.' Yule's *Syllabus of a Year's Course of Practical Work in the Physiological Laboratory of Magdalen College, Oxford*, was printed in 1871!

An appreciation of Yule in those days has been supplied by my friend Dr. Dixey, who in a letter to me writes:

'I was, as you know, one of Charles Yule's pupils in the early days of the Magdalen laboratory. I worked there with D'Arcy Power, Jeffrey Bell, Nias, Peck, and Hawker. In those days Yule was a most stimulating teacher, alert, bright, and active in mind and body, with a most frank and pleasant manner. He had many interests, but was neither desultory nor slack in his teaching. He always gave me at any rate the impression of having a thorough grasp of his subject and a strong love for experimental physiology. His organization of our laboratory work was excellent, and must have cost him much labour; while his comments on our performances were fresh and suggestive in a high degree. One always felt, too, that he took a strong personal interest in us all; he never resented being bothered "out of hours", and his delightful rooms on the Kitchen Staircase, where he gave his artistic and musical taste full play, were open at all times to any of us who sought help or counsel. I remember on one occasion especially, coming to consult him without notice on a matter which though important to me might well have seemed trivial to him. He happened to be entertaining a large and merry lunch party, but he would by no means consent to my going away until he had solved my difficulties in his genial and humorous fashion. His manner on such occasions showed a happy blend of shrewdness and kindly feeling. He was quite ready, when necessary, to administer a timely rebuke, but it was always done in the most good-humoured and friendly way, and left no sense of injustice or want of

sympathy. I don't think I ever knew him to be out of temper. He always seemed to see the humorous side of things by preference, and whether he was chaffing old "John", or coaxing some instrument to do its work, or trying to keep one of us up to what he thought the proper mark, he preserved the same sunny and unruffled demeanour. I retain a lively mental picture of his slim and active figure as he used to stand in the laboratory, generally wearing a rather battered cap with unfamiliar Cambridge trimming on it, bending over some recording instrument and occasionally giving vent to a playful joke, or, if things were going wrong, to some half-serious expression of humorous vexation. This is what he was like during my time as an undergraduate. When I next saw him after the lapse of many years, he was no longer the same man, and it was but too evident that his powers were failing. But I can never look back upon the days when I first knew him without feelings of gratitude and affection.'

But there was something lacking in Yule's character. The new work, started with every promise of becoming a great success, gradually withered like a plant in an uncongenial soil. No doubt the inspiring example of the Cambridge school was far away; College pleasures and duties were thrust upon him, and his work at the Laboratory became intermittent. Having been born at Plymouth, he took naturally to the sea. He was a keen yachtsman. I believe that he held a master's certificate. With the result that terms, too full of interruptions for solid experimental work in physiology, were followed by vacations sailing in the Channel. Nevertheless the Physiological Laboratory he arranged was of real use, and men who have since attained to high scientific or medical eminence did useful work in it. Of Yule's own research only a small note on the *Action of Urari* reached publication, but he got the Laboratory licensed for the performance of experiments upon living animals, and obtained some excellent equipment, which will be mentioned again in describing Professor Burdon-Sanderson's own work. For one decade the Daubeny Building housed the only Physiological Laboratory in Oxford.

On the last occasion on which I met Sir Michael Foster, he asked for news of Yule—'What is Yule doing?' I gave the last news we had from his country-living at Ashbury, and then Foster, forgetting the disparity of our years and the colour of Yule's cloth, replied, 'When you see him, kick him for me. Had he continued as he began, he would now be your Professor of Physiology at Oxford.'

The late G. E. Underhill, who accompanied Yule on one of his yachting trips, was good enough to write the following account of Yule as a sailor and yacht designer.

'Charlie Yule, as he was always known to his friends, was a born sailor. His father had been a Commander in the Navy and his grandfather had fought under Nelson at Trafalgar. Charlie Yule himself, by some ill luck a college don, was never happier than when sailing his own boat in a stiff breeze. He was a thoroughgoing navigator, having obtained, I believe, a master's certificate. He always took his own observation and gave his own sailing directions to his skipper. He built two schooner yachts from his own designs at Wivenhoe, the first of 18 tons, in which he crossed over to Holland and took a voyage in the Dutch Canals, the second a very seaworthy boat of 35 tons, named the *Comus*, in which he crossed the North Sea and then through the Eide Canal to Kiel in the year 1884. He got as far as Pillau in East Prussia and came home by Copenhagen and Christiansand. The steadiness of his craft was fully put to the test in a heavy storm in the Skager Rack, when the *Comus* rode over enormous seas like a duck. This was the longest trip that Yule ever took: he was out for nearly three months. After the selling of the *Comus* two or three years later Yule's yachting days were ended.'

And lastly the following reminiscences of a still earlier period have been penned by Canon Sawyer, Headmaster of Shrewsbury, who takes us back to the time when he was a chorister, and Yule was a Master at Magdalen College School.

'I have read with great interest your reminiscences of Yule, and there is very little that I can add to them. But a school-

boy's memories of him may not be out of place in the record. He was, perhaps, the kindest of an unusually kind set of Masters—many would say, too kind. He certainly fed us royally, especially if we were out of sorts: I am afraid more than one boy discovered that he had "consumptive tendencies" to qualify for Yule's port wine and biscuits after Chapel. But there were healthier qualifications for Yule's good cheer—especially a love of music. A great friend of Sir Walter Parratt, and himself no mean musician, he had delightful, informal supper-parties, followed by madrigals and string quartettes. I, at any rate, learnt to love Bach and Purcell in his rooms, almost as much as in Magdalen Chapel. And in the same easy and unofficial way he taught us to understand and appreciate good pictures. I still have pictures, painted by himself or his artist friends, who were many. From him, too, I learnt whatever I know of Science. At any rate he fired my imagination with the wonders of Science. Though incorrigibly classical, and hopelessly unscientific in capacity and method, I sat at his feet, while he talked, both in the voluntary lectures which he gave to the School, and in conversation which accompanied his parties on the Cherwell, or his walks to Wytham Strawberry Gardens, about Protective Mimicry, or Vivisection, or Evolution. The last subject interested me particularly; and I owe it to Yule, still more to Aubrey Moore, to whom Yule introduced me, that I never was unsettled for a moment by the so-called "conflict" between Religion and Science.

'I should like, too, to write a few lines about Yule's life after he left Magdalen, much of which is misunderstood. He left Magdalen with the highest motives. Like many more, he felt that the temptation to idleness and self-indulgence were too strong for him at Oxford, and he resolved to cut himself adrift from it. He intended to take Holy Orders, and to prepare himself for them he went and worked as layman in a slum parish in East London. This was the best part of his life, and few people know anything about it. I have a vivid memory of going to stay with him. I saw with wonder the bon-vivant who fully appreciated the best that Magdalen

Common Room could provide—and in the early "eighties" it was the very best—sitting down contentedly in a workman's tenement to dine off a steak (which he soon trained his humble cook to grill "as well as Bennett himself"!) and a pint of porter (of which he found a special "tap" by making friends with a local publican). And I heard with equal wonder, and real delight, this trained man of science solemnly, or rather humorously, arguing with a heckler in Victoria Park on "Men and Monkeys", or "Who was Cain's Wife", which were the fashionable problems in those parts suggested by the book of Genesis and the writings of Darwin. In this work—all too short—his expert knowledge, as well as his kindness and geniality, made him a huge success. Thence he went, after being Ordained, to Alcester, as curate to Rev. R. H. Williams, where he was much loved by the poor, socially most popular, and decidedly effective in the pulpit. I still remember a Harvest Sermon he preached on the "Rain and the Fruitful Seasons" as a witness to God—it might have been presented before the British Association.

'Then Magdalen gave him the living of Horspath—but it was too near the old temptations. So he moved again—unfortunately to the wrong place—Ashbury, cut off from his friends, and his science, and the sea. This was the beginning of the end: he undoubtedly began to lose his reason. But he was amazingly kind to the poor, especially their sick or crippled children, and, in spite of his faults and eccentricities, which now were very many, they loved him to the end.'

Edward Chapman.

Edward Chapman was born on the 12th of October 1839. He was the eldest of the three sons of John Chapman, M.A., M.P., D.L., of Hill End, Mottram, Cheshire. As one of the largest original shareholders in the Manchester, Sheffield, and Lincolnshire Railway Company, now known as the Great Central Railway, John Chapman had been a Director for thirty-seven years (1840–77), and Chairman from 1860 to 1864. In the early days of the Company he had under-

taken responsibility for its debts, and his interest in it never flagged.

During the last year of his Chairmanship the Royal Assent was obtained to a Bill empowering the Company to run steamers from Grimsby, with the result that until the great War a daily service with Hamburg was maintained, with regular sailings to Antwerp and Rotterdam.

It is thanks to the enterprise of John Chapman and his co-directors that Grimsby has become a household word. They promoted a fleet of ships for Deep Sea Fishing, and started the trade that has made Grimsby the largest fishing port in the world, over 100,000 tons of fish being annually brought in from the North Sea. He was elected M.P. for Grimsby in 1874.

John Chapman had been a gentleman-commoner of St. Mary Hall, where his arms may still be seen emblazoned on a window of the dining chamber, now a Common Room of Oriel College, into which the Society of St. Mary Hall with its buildings was incorporated in 1902. His sons, Edward, George, and Charles, came up to Oxford as commoners of Merton College.

Edward entered in 1860, just one year before his friend Dr. Creighton, afterwards Bishop of London. His note-books show him to have been a worker. W. C. Sidgwick acted as his first College tutor for Mods., but after June 1861 he worked more particularly with George Griffith of Jesus College. He took a First Class in Natural Science in 1864, in a class list which only contained eight names in all. It was a performance that was all the more creditable because he had married while still *in statu pupillari* on July 29 of the preceding year. To his wife, the daughter of F. Grundy of Mottram, both the College and the College School owe several benefactions.

The newly-married couple continued to reside in Oxford, first in Beaumont Street, and then in what at that time was one of the most attractive houses in the city—Frewen Hall—which had recently been put in order for the use of the Prince of Wales, later his Majesty King Edward VII. Those

were days before the old world character of the secluded garden had been impaired by the erection of the overtopping Debating Hall at the Union, and later by Dr. Shadwell's alterations to the house itself.

Edward Chapman thus found himself, at the age of twenty-six, a junior in academic circles, but happily married, and with the means to indulge a bent for hospitality in which, as in all else during the course of a long married life, he was very ably seconded by his wife.

Dinner parties played an important though unacknowledged part in the regimen of the University in their day, and the young couple obtained a social influence that, at their time of life, talent alone could not have procured for them. The friends they gathered around them at Frewen Hall included: Dean Liddell, Professor Jowett, Dr. 'Bat' Price, Professor Rolleston, Henry Smith, Mr. 'Registrar' Turner, and many others; and many distinguished visitors to Oxford were entertained under their hospitable roof. The vacations were partly spent at a holiday house at Sandown in the Isle of Wight.

Two events divided the life of Edward Chapman into three periods. Firstly the death of his father in 1877, and then in 1894 the additional heavy duties in connexion with the expansion of the Great Central Railway. From 1864 until 1877 Edward Chapman's energies were principally devoted to the multifarious calls of a busy and useful University life. In those days students, and still more teachers, of Natural Science were few in Oxford, and a capable and willing helper soon found his hands full. He was asked to lecture first in his own College, Merton, then for Jesus and Wadham Colleges, and finally in Lent 1869 for Magdalen College also. 'By an arrangement entered into with the Linacre Professor the Physiological Series in the University Museum will be available for the Catechetical illustration of these Lectures.' He was further employed by Dr. Rolleston, as assistant Demonstrator in Comparative Anatomy at the University Laboratories. In November 1869 he became a candidate for the Lee's Readership in Anatomy at Christ Church. Sir Henry

Acland, Professor Phillips, Dr. Payne, and Dr. Church all contributed testimonials, which were further supported by letters from former pupils, C. S. Tomes, G. H. West, E. R. Smart, Sir J. Conroy, F. B. Howell, and the Rev. G. H. Lightfoot. It is fortunate for Magdalen that he was unsuccessful.

As time went on work both for the College and University grew upon him. He acted as Public Examiner in the Natural Science School. His sociability, allied to a considerable talent for organization, made Committee work a pleasure to him, and he soon found himself a member of numerous bodies. He became Delegate of Local Examinations, Delegate for University Extension, Curator of the Botanic Gardens, and Curator of the Hope Zoological collections.

At a Congregation held on June 18, 1878, Edward Chapman, M.A., Merton College, was elected Delegate of the University Museum, in place of the Rev. Robert Main, M.A., deceased. The votes recorded were, for E. Chapman, M.A., 63: for W. Esson, M.A., 48.

Medical matters always claimed his interest, and his practical assistance to the cause received early recognition at the meeting of the British Medical Association in Oxford in the summer of 1868, and though not a medical man, he was chosen to act as Honorary Secretary. In order to facilitate procedure on future occasions, he compiled a scrap-book of all the printed papers for the meeting. This may now be consulted in the Bodleian Library. The value of his work was acknowledged by the *British Medical Journal* for August 1868 as follows:

'It is impossible to allow the Oxford meeting to pass over without endeavouring to express that sense of the great exertions of individuals, by which alone a meeting of such extended proportions was successfully conducted—its creature comforts and its intellectual activity equally attended to. The President, Dr. Acland, was most fortunate, and conferred great benefit upon the Association by enlisting the services, as Honorary Secretaries, of Mr. Edward Chapman, M.A., Merton College, Dr. Gray, and Dr. Tuckwell. The Association specially marked its sense of the singular earnestness, ability,

and energy with which Mr. Chapman threw himself into the task of organization and the work of preparation for the meeting, by electing him on its first list of Honorary Fellows, and into a Society in which any man may be proud to find himself. Mr. Chapman's services call for the warmer acknowledgement, that, not being himself a member of our profession, but a distinguished teacher of physical science, his labours have afforded a special pledge of sympathy with our objects.'

In 1869 he was Secretary to the Physiological Section of the British Medical Association at the Leeds Meeting. In Oxford much time was devoted to quiet but continuous work on the Board of Management of the Radcliffe Infirmary, where in particular the starting and maintenance of a Children's Ward was largely due to his initiative.

To the Botanic Garden Chapman rendered very special service. Elected a Curator under the scheme of 1876, and re-elected under the new scheme of 1887, he arranged for the better classification and preservation of the Herbarium, and as Secretary and Treasurer managed the accounts and affairs of the Garden for three successive Professors. He was also for many years joint Secretary of the Ashmolean Society, having as his colleague the celebrated Professor Henry Smith, with whom he worked on terms of much friendship. Meanwhile his College work was growing. Magdalen College, having the Daubeny Laboratory, possessed special opportunities for developing the study of several of the Natural Sciences, and as the College grew, the number of Chapman's pupils steadily increased. Their names and distinctions have already been printed in this Register.

Chapman's aim as a College tutor was to give his pupils in Natural Science the same personal and detailed help in their work, and to take the same interest in them, that it is traditional among Oxford tutors in literary subjects to extend to those placed in their charge. He had all the qualifications necessary for the attainment of this ideal, and the general consensus of undergraduate opinion in College was that the Natural Science men were on the whole better looked after in Magdalen than in any other College, and than

any other class of men in their own College. Many of his pupils felt that they owed much of the success in their career to the lively interest taken in them at the start by 'Good Old Chappie'. In him we had a tutor of exceptional abilities. His colleagues recognized them, and were wise enough to leave the conduct of scientific teaching in his hands. The results justified their trust, and Magdalen became generally known as one of the leading scientific colleges in the University. When empowered by the new Statutes to do so, the College showed their sense of his merit by electing him an Official Fellow. He held this position for twenty-five years until 1894.

So far we have sketched but half the picture. Chapman's was in every way an unusual life. For twenty-five years he spent more than half the year in engrossing University work. 'Full Term' was for him indeed full term, a time filled to overflowing with a round of varied academic duties. The vacations, in which an ordinary tutor takes a holiday, or devotes himself to research or study, were increasingly taken up with the duties of a country gentleman, magistrate, and railway director.

After the death of his father on July 18, 1877, new duties in the north were pressed upon him. He was elected a Director of the Manchester, Sheffield, and Lincoln Railway Company on the 26th of April, 1878, in succession to Sir James Watt, and was chosen a member of the Finance, Traffic, and Stores Committee. At this time he contemplated giving up work in Oxford and settling down to the management of his estates, and of his railways; but pressure was put upon him to remain at Oxford, notably by Henry Smith and by Professor Rolleston, who urged him in a striking letter[1] not to leave

1 Oxford, Satuday,
Aug. 11, 1877.

My dear Chapman,

I had been intending before I saw you yesterday and to-day to write to you and say that I was hoping that you would not, now under altered circumstances leave Oxford.

The expediency or inexpediency of such a step is twofold; as regards yourself and as regards this place. As regards yourself firstly; you were

the University but to make use of the 'facilities of modern locomotion' and 'live in two places'. This advice was taken, and Chapman, as we have seen, continued to reside during a portion of each year in Oxford until the summer of 1894.

But eventually the demands of his property and still more of railway work became so weighty that this dual life could no longer be carried on; Chapman gave up his Tutorship to the regret alike of pupils and colleagues. Many of the former marked their regret at the severance of old ties by a complimentary dinner in the College Hall on Jan. 17, 1895, and by the presentation of a piece of plate commemorative of his twenty-five years Tutorship. His colleagues were able to find compensation in re-electing him, under special powers, a Fellow of the College without emolument. He remained for several years a constant attendant at the College meetings and gatherings, and few even of its residents kept up the knowledge of the College business more assiduously than the Deputy Chairman of the Great Central Railway.

very useful in many ways in this place, and have filled places and met occasions such as Association Meetings, which are great occasions, as well as smaller engagements such as our ordinary work and life is made up of, in a way which would (to put it in a very guarded form) make your absence very constantly and very much felt. Secondly you have made many friends which all men, and even all deserving men, do not make, and you will not find it, even though you are still young, [easy] to make yourself another such connexion in a fresh place. And this place has its advantages in the way of personnel.—After all, what is life worth living for except for the two things I have named, viz. usefulness and friendships?

As regards this place you have to consider that there are several Institutions at various points within its precincts all the way from Magdalen Bridge to the Radcliffe Infirmary in which you have functions assigned to you, which functions here have as strong a claim upon your attention as functions anywhere else.—Just think of this, and weigh what can be done against what could be done anywhere else.

For myself in the third place let me say that I should miss you very much and I sincerely trust that the facilities of modern locomotion with the advantages of having two places to live in for the sake of change will make you feel that, while much would be lost by leaving Oxford, there is really no urgency for taking the step.

Yours very truly,

GEORGE ROLLESTON.

After being elected on to the Board of the Manchester, Sheffield, and Lincolnshire Railway, Edward Chapman became a very active Director, and was appointed to a number of important Committees. When the Earl of Wharncliffe became Chairman, Chapman on the 16th of June, 1894, was elected to succeed him as Deputy Chairman of the Company. He was also a Member of the Finance, Traffic, and Stores Committees, Chairman of the Locomotive and Carriage and Wagon Committee, and of the Hotels Committee, a Director of the Sheffield and South Yorkshire Navigation Company (practically the whole of the ordinary Stock of which is held by the Great Central Company), a Member of the Cheshire Lines Committee, of the Great Western and Great Central Joint Committee, of the Great Central and Metropolitan Joint Committee, a Member of the Humber Conservancy Board of Commissioners, Macclesfield Committee, North Wales and Liverpool Railway, Oldham Railway, Sheffield and Midland Railway, Manchester South Junction and Altrincham Railway, and St. Helens Railway, and was Chairman of the Wigan Junction Board, a representative on the Railway Clearing House Committee, and a Director of the South Eastern Railway.

In 1899 the Great Central Company was extended from Sheffield to London. The extension marking a new era in the life of the Company was inaugurated on March the 9th by proceedings which included a monster luncheon given in the new terminal station at Marylebone.

The then Chairman of the Company, the Earl of Wharncliffe, being indisposed, his duties devolved on Edward Chapman, the Deputy Chairman.

The new line, which will probably be the last great line of railway to be brought into London from the North, was formally opened by the Right Hon. C. T. Ritchie, M.P., President of the Board of Trade. Chapman always looked back upon this extension with pride and pleasure as a fitting consummation to the long connexion he had had with the railway both by family tradition and personal association.

At home the manifold duties connected with his estates took much of his time. Printed copies of his Address to his

Hattersley Tenants were still in request fifteen years after it had been delivered. He was a Magistrate, Chairman of the Mottram Conservative Election Committee in 1880, of the Mottram District Council, and of the Local Board. He built a Chapel at Broadbottom, and erected a drinking fountain in the Market Place at Mottram to commemorate the completion of the water scheme for Mottram and Broadbottom (1885).

In February 1900 he was adopted as the Unionist Candidate for the Hyde Division of Cheshire. On September 29 he opened his electioneering campaign at Romilly, and on October 11 heading the Poll with a majority of 579 votes: Chapman, 4,774 votes, Sir John Brunner, 4,195. His maiden speech in the House on the Rating of Machinery Bill, was printed for the Machinery Users Association by Wyman, London, 1902. As M.P. for 1900–5 he attended 1,635 out of 2,106 divisions. His popularity followed him to the House, but the stress of political life proved great. The election of January 1906 tried him severely. He had to contest the seat against a younger man and was defeated.

The following is taken from his own notes:

Declaration of Poll at Hyde, 25 January 1906.

Breakfast. Sparrow and I drive down to Hyde, leaving at 9.20, all our men giving us a good send off from the front door. Walked to Town Hall at 10. Mr. Taylor, deputy returning officer, Schwann and his agent, Lancashire, Dr. Tinker and others. Boxes opened and papers arranged in bundles of 25 each, ending at 11.30. Saw in good time that the votes were going against me. Chatted with various people and wrote out my telegrams. Over at 12.30. Seconded vote of thanks to returning officers and congratulated Schwann.

Poll. Schwann 5,545. Chapman 4,482.

Majority 1,063. 25 spoiled votes. Result declared to crowd from balcony. Walked to Conservative Club, being cheered all the way as a victor. Spoke from balcony to crowd; also in room. Great enthusiasm. Champagne from friends in club. Drove home, Sparrow with me, getting to Hill End 2.1. Bess, Edie there. Lunch. Much touched by the warmth and enthusiasm of all my supporters. Chatting,

smoking. Telegrams of condolence. C. Higham came in before dinner and with Kate's help wrote letter of thanks to electors for N. C. H. [*North Cheshire Herald*] to-morrow. Wrote letters right up to dinner time.—Lancashire and Drinkwater to comfort them. Serenaders all evening singing and cheering. Bed 11, very tired.

At Home. *Not elected for Hyde.*

26 Jan. Fair night. Delightful thought to have a free day. James Hadfield in after b'fast. Rested a.m. Sparrow went out shooting for the day with Evill.—Number of kind letters. Sorted papers until lunch. —Read, cigar and sleep.—Tea and wrote numerous letters up to dinner. Cigar with Sparrow after: all of us very sleepy and tired and bed 11. I had head cold. Serenaders outside. Yard full of girls and boys with torches. Went out to see them.

At Home.

Every one full of sympathy. I feel far more for the disappointment of my workers than for myself.

Causes of my defeat.

Chinese slavery so-called. Misrepresentation of my votes, for which an apology was given. Reckless promises such as lands for the people—cheaper food—higher wages and shorter hours—cries of 'Hands off the people's food', 'Chapman and dear Food', 'Chapman and Chinese Slavery'. Falsehoods on taxing cotton. Strong wave of reaction passing over the country and the loss of the adjacent seats.

It was the smallest defeat in Cheshire, and the smallest turn-over of votes.

A slight incident occurred during the canvass for this election that is of interest in the light of recent events. Mr. Chapman's opponent, a man with a Teutonic name, was supported by Sir J. Brunner, Bart., who by way of illustrating his opinions, publicly stated that his hat was made in Germany, and is reported to have gone on to ask, 'Had any one a right to say he should not buy a hat from Germany, but must buy an English hat? He didn't see that he did anything wrong in pleasing himself where he bought his hat.'

Six months later, on July 25, 1906, Edward Chapman died at Hill End, aged 66. He was buried in the family vault at Mottram.

In the manifold interests of his full and strenuous life, as a teacher and organizer of Natural Science at Oxford, as a landowner and country gentleman, as a railway magnate, and as a Member of Parliament, Edward Chapman was, and will remain, an exceptional man. Most of those who were privileged to know him saw but one side of his activities, and his most intimate friends could not follow him in all the societies in which he moved. His achievements can only be adequately described by those who came in contact with him in each sphere, yet his great and endearing qualities were manifest to all. His character had the quality of a crystal, in which the brightness of the various faces can only be seen in some lights and from particular sides, but the clearness and unsullied purity of the core is apparent from all points of view. His name recalls a wealth of pleasant recollections.

The kindly instruction and advice as Science Tutor in his private study in the Daubeny Building: his gatherings in the study at Magdalen Gate House after Hall on Sunday evenings, where dons and undergraduates met on equal ground: the riotous mirth when his friend Edward Tuckwell was of the party: the tortoise races in the Magdalen Gate House garden: and at Hill End a picture-gallery, with such masterpieces as Turner's 'Proserpine' and 'The Plains of Enna', Firth's 'Coming of Age', and Wilkie's 'Rent Day'. He was fond of reading the Lessons both in Magdalen Chapel and at Mottram where, as befitted the squire, he sat with the members of his household in the family pew in the Stayley Chapel. He delighted in telling the latest story of the Mottram parson whose sermons 'would never have branched so widely in his discourse, that if his text had had the small-pox, his sermon would never have caught it'. As becomes a place presided over by one so genial and kind-hearted there were several picturesque characters among the old servants at Hill End: Harris, Old Billy, Clifford, Hadfield, and Hyde. Their master delighted in them and had a sheaf of good-

natured stories about each. His kindness endeared him to all his dependents and to out-of-work mill-hands in the village, who in hard times could line up in his yard for relief. There was much of interest for guests at Hill End. For those who cared for such things the Billiard Room was a museum of all kinds of treasures: there were the plant-houses and the workshop with the perfectly appointed Holtzapffel lathe that had belonged to Toovey Hopkins. There were visits to the great engineering works at Gorton and in Sheffield, and to the neighbouring mills; trips in contractors' trollies along the dry bed of the Manchester Ship Canal; the functions of the day such as the laying of foundation stones, sod-cutting on a new line of railway, the inauguration of a dock at Grimsby, &c., events with inherent possibilities of dullness, but rendered pleasurable in the cheery company of a host who knew how to infuse his own spirit into formalities, and had the happy gift of seeing the best side of everything and of every one with whom he was brought into contact.

In these days a man of Edward Chapman's engaging qualities is described in general terms as 'popular among all classes', but it is no exaggeration in his case to use the old-fashioned word 'beloved'. It was a feudal attachment that drew thousands to line the road in silent homage on that afternoon in July 1906 when his body was borne from Hill End to its last resting place in Mottram churchyard.

BIOGRAPHICAL AND OBITUARY NOTICES:

Times, 2 Aug. 1906.

North Cheshire Herald.

Notice by W. H. Edge, of the Secretary's Office, *Great Central Railway Journal*, ii, with a portrait, Sept. 1906.

Court Circular, 11 Nov. 1899 (by S. E. T.).

John Scott Burdon-Sanderson.

1829, 21 Dec. Born at Jesmond, near Newcastle-on-Tyne. Educated at home.

1847, 2 Nov. Matriculated at Edinburgh, where he attended the lectures of Professors Balfour (Botany), Goodsir (Anatomy), and Bennett[1] (Medicine).

1848, 17 Nov. Read a paper on 'Vegetable Irritability' before the Royal Medical Society.

1850–1. President of Royal Medical Society.

1851. *On the Metamorphosis of the coloured Blood Corpuscles.* Thesis for D.Med., for which one of the Gold Medals was awarded. *Edinb. Monthly J. Med. Sci.* 1851.

1851–2. In Paris. Work at organic chemistry with Gerhardt and Wurtz, embryology with Coste, physiology with Claude Bernard, whose influence on Sanderson's later work was most marked.

1853, 9 Aug. Married Ghetal, da. of Rev. Ridley H. Herschell.

1854. Medical Registrar, St. Mary's Hospital. Lecturer on Botany St. Mary's Hospital.

1854. Vegetable Reproduction. Todd's *Cyclopaedia of Anat. and Physiology.*

1855–62. Lecturer on Medical Jurisprudence, St. Mary's Hospital.

1855, March. M.R.C.P.

1856–67. Medical Officer of Health for Paddington.

1859, Dec.–'67. Asst. Physician, Brompton Hospital for Consumption.

1860–5. Inspector in Medical Department of the Privy Council. His contributions to the *Annual Reports* of the Medical Officer of the Privy Council extend over twenty years.

1862. Experiments on Artificial Respiration for the recovery of the apparently drowned.

1863–70. Asst. Physician, Middlesex Hospital.

1865, April. Report on German Cerebro-Spinal Meningitis.
October. Cattle Plague.

1866–70. Lecturer on Physiology, Middlesex Hospital.

1867. F.R.S. Croonian Lecture—The influence exercised by the Movements of Respiration on the Circulation of the Blood.
Physician at Brompton Hospital (until 1871).

[1] The first teacher to 'place the microscope in the students' hands'.

1869. On the Intimate Pathology of Contagium.

1870. Hired a private laboratory, 'a poor affair—nothing more than a room over a stable in Howland Street', but where, with the collaboration of Lauder Brunton, Ferrier, and Klein, much valuable work was done. Professor of Practical Physiology and Histology at University College, London.

1872–8. Professor Superintendent of the Brown Institution, the first Pathological Laboratory in Great Britain.

1873. Handbook for the Physiological Laboratory [with Foster, Brunton, and Klein].

1874–83. Jodrell Professor of Human Physiology.

1876, 31 Mar. Foundation of the Physiological Society at his house, 49 Queen Anne Street.

1877. Croonian Lecture—The Mechanical Effects and the Electrical Disturbance Consequent on Excitation of the leaf of *Dionaea muscipula.*

1878. Harveian Orator, Royal College of Physicians.

1880. The Time-relations of the Excitatory Process in the Ventricle of the Heart of the Frog. *J. Physiol.*

1882. The Electromotive Properties of the Leaf of Dionaea in the Excited and Unexcited States. *Phil. Trans.*

1882, 9 June. The Excitability of Plants. Read at the Royal Institution, reprinted in the 'Memoir'.

1882, Nov.–'95. Waynflete Professor of Physiology at Oxford.

12 Dec. Fellow of Magdalen College.

1883. The Study of Physiology: its relation to other studies and its use as a preparation for that of Medicine. Public Lecture at Oxford.

1883, Feb. £1,500 for Physiological Apparatus voted by Convocation.

5 June. £10,000 for Physiological Laboratory voted by Convocation (majority of 3).

Royal Medal of Royal Society.

1883. On the Electrical Phenomena of the Excitatory Process in the Heart of the Frog and of the Tortoise, as investigated photographically. *J. Physiol.*

1884, 5 Feb. £10,000 to be realized by sale of stock voted by Convocation by a majority of 31.

1884, 10 Mar. £500, annually, for coal, gas, and water refused.

1886. At Arcachon to investigate electric organ of the Skate.

1886–7. Served on Hydrophobia Commission.

1887. At St. Andrew's Marine Laboratory.

1888. At Plymouth.

1889. President of Biological Section of the British Association. Address on Elementary Problems in Physiology.

1893. President of the British Association. The Origin and Meaning of the term 'Biology'.

1895–1903. Regius Professor of Medicine.

1895. The Electrical Response to Stimulation of Muscle and its Relation to the Mechanical Response.

1896. Ludwig and Modern Physiology. *Science Progress*, March.

1899. Created a Baronet.

Croonian Lecture—The Relation of Motion in Animals and Plants to the Electrical Phenomena associated with it.

1900. The Mechanical, Thermal, and Electrical Properties of Striped Muscle. *Textbook of Physiology.*

1900. The Cellular Pathology of to-day. Address to the 13th Internat. Med. Congress at Paris. *Lancet.*

1901. Our duty to the Consumptive Bread-Winner. Address to the Oxford and District and Reading Branches of the Brit. Med. Association. *Brit. Med. Journal.*

1905, 23 Nov. Died at 64 Banbury Road, aged 75 years.

Portraits:

1885. Photograph by E. A. Schäfer. Printed in *B. M. J.* 1905.

1885. Portrait by Ouless. Marble Bust by Hope Pinker (in University Museum).

1893. Oil painting, by John Collier (in Physiological Lecture Room). Oil painting, by Ch. Furse (in Magdalen College Hall). Cartoon by F. C. Gould, in *Westminster Gazette.*

1894. Photograph by Miss Acland. Cartoon by 'Spy', in *Vanity Fair.*

Obituary Notices:

By Gotch, Klein, Ritchie, Seaton, Church, Arthur Thomson, Collier, Allbutt, McKendrick, Horsley, Waller, Halliburton, Hill, Pembrey, Sherrington, Stirling. *British Med. Journal*, 2 Dec. 1905.

F. G[otch], *Proc. Royal Soc.* lxxix.

Lady Burdon-Sanderson and J. S. Haldane. *Sir John Burdon-Sanderson: A Memoir.* Oxford, 1911.

Burdon-Sanderson retained throughout life his youthful fondness for plants and botanical studies, so that he hardly needed the compelling stimulus of a correspondence with Charles Darwin to investigate the latter's 'beloved Drosera: a wonderful plant or, rather, a most sagacious animal'. The problem to be solved was whether or no the excitable cells of a plant exhibit phenomena similar to those exhibited by excitable animal tissues. The idea that the herbs of the field could in any sense be 'poor relations' to a man, which has become less unfamiliar in modern days, was then as strange and provoked as much controversy as the discussion on zoophytes or animal-plants in the days of old.

'Drosera led to Dionæa, which is characterized by the rapid character of the movement of its leaf lobes when certain hairs upon their inner surface are touched. The exquisite sensibility of the hairs to mechanical displacement and the extraordinarily rapid character of the mechanical alteration in the leaf attracted the attention of Burdon-Sanderson, who saw in this plant an organ admirably fitted for the investigation of fundamental phenomena.

'He therefore, about 1875, commenced an investigation as to the changes which were associated with this active process and the conditions which influenced their production and character. In the course of this inquiry he discovered that there was a pronounced electromotive change in the leaf every time it passed into the active state. He then devised an ingenious method for keeping the leaves forcibly open by fixation in plaster of Paris, and demonstrated that although no mechanical movement could now take place when an excitable hair was touched, yet each local stimulus of this kind still evoked an excitatory response, since the same active electromotive change was observed. This active "electrical response" was of considerable magnitude, although of comparatively short duration, and its peculiar interest lay in the circumstance that it was successively developed in all parts of the leaf lobes, indicating the propagation of some active cellular change from the seat of the stimulus to more remote regions.

'In 1877 an account of this discovery, together with the experimental determination of the time-relations of this electrical response, formed the subject of the Croonian Lecture of that year, the title of the lecture being "The Mechanical Effects and the Electrical Disturbance Consequent on Excitation of the Leaf of *Dionæa muscipula*". Five years later, in 1882, a more extended and detailed account of the phenomena was published in the *Philosophical Transactions*, entitled "The Electromotive Properties of the Leaf of Dionæa in the Excited and Unexcited States". From the careful analysis which he had made of his experimental observations, he concluded that the excitatory disturbance, "by the mode of its origin, the suddenness of its incidence and the rapidity of its propagation, is distinguished from every other phenomenon except the corresponding process in the excitable tissues of animals". "In the one case as in the other," he continues, "we must regard the electrical change as a visible sign of an unknown molecular process." The actual mechanical displacement he agreed with Pfeffer in considering as probably related to "the diminution of the turgor or water-charge of the protoplasm of the excitable cells". The experimental evidence which he now brought forward appeared to indicate two possible sources of electromotive change; there was shown to be an initial or primary change, sudden in its development, brief in its duration, and always of the same general type; this he regarded as the electrolytic indication of the peculiar molecular alteration in the plant cells which constitutes the excitatory state; it was succeeded by a second change of longer duration and often of different sign, which was attended by a prolonged residuum or after-effect; this he regarded as associated with diminished turgor and consequent displacement of water. It was only by accurate methods of recording that he was enabled to discriminate between the primary and secondary effects, and to show that as regards the primary or initial change the active excitatory state is fundamentally the same, whether it occurs in these vegetable cells or in excitable animal tissues.'[1]

It was at this stage of the work that he left his happy and

[1] Gotch, *Proc. R. S.*, vol. 17, 1907.

settled life in London to face the troubles and now almost unimaginable bitterness amid which the foundations of our modern Oxford medical school were laid. We are glad to think that in the upper rooms of our peaceful Laboratory by the Physic Garden, he was able to abstract his thoughts from the turmoil of controversy and Convocation, and peacefully to explore the outskirts of knowledge with instruments of the utmost delicacy and precision.

Francis Gotch, who helped him at the Daubeny Laboratory, has told me that the work was done with the perfected Lippman's capillary electrometer, a special double rheotome, and the Elliot-Thomson galvanometer (*Daub. Reg.*, p. 22), which was frequently borrowed for subject work in the Physiological Laboratory in after years. The report on the observations, especially as to the behaviour of what he termed 'modified leaves', was printed in the *Philosophical Transactions* for 1888, and the paper was illustrated by photographic records of the excitatory electrical changes.

'The observations show several interesting facts, but the chief points brought out refer to the so-called "modification", which is produced in a leaf when it is subjected to the flow of even a weak voltaic current. The modification reveals itself as a permanent alteration in the amount, and even the sign of the electrical state of the inactive leaf-surface. It is localised to the part which the modifying current has traversed, and is associated with a remarkable diminution in the high electrical resistance of the tissue, this diminution being strictly confined to the modified region. Finally, the records give demonstrative proof that, when any such modified area is thrown into the active state, either by direct stimulation, or by the arrival of a propagated excitatory wave aroused elsewhere, then the electrical response in this area, whilst it has the same time relations, may be entirely changed as regards its sign. This extraordinary reversal is related to the sign of the inactive tissue, and, when through a modifying agency this is altered, then the sign of the active change may be similarly reversed.

'From the constancy of this relationship, Burdon-Sanderson

inferred "that the constantly operative electromotive forces, which find their expression in the persistent difference of potential between the opposite (leaf) surfaces, and those more transitory ones, which are called into existence by stimulation, have the same seat, the opposition between them being in accordance with the general principle that, whereas the property which renders a structure capable of undergoing the excitatory change, is expressed by *relative positivity*, the condition of discharge is expressed by *relative negativity*".'

My first acquaintance with him was at a dinner-party given at Magdalen Gate House by Edward Chapman, my tutor, near the close of my freshman's term. He referred to my work in a Demyship paper which he had set, and in the most kind and sympathetic way discussed my proposed line of reading, even though it was not to be in Physiology.

There are many stories of his absent-mindedness: the following in an authentic one.

Our tutor, Edward Chapman, had invited two freshman Demies, Edward Stainer and myself, to meet Professor Burdon-Sanderson, who had examined us in Physiology in the Demyship Examination. Freshman-like, I went to my tutor's house in cap and gown, but learning from the butler that academical dress was not worn at ordinary dinner-parties, left them in the hall. Stainer and I were among the last to leave, and my gown was not forthcoming. The butler, however, promised to send it, should it turn up, across to College in the morning.

Next day Stainer and I were away at our several lectures and laboratories at the Museum, when in the middle of the morning some one, I think it was Peverel Hichens, came round in a great state of excitement to where I was working, and said, 'The "Burder" has been lecturing in your gown'. He had not only left the dinner-party, taking a gown that did not fit him, but had worn a short, round-sleeved scholar's gown for his lecture, instead of his long and heavier doctor's gown. I heard that he was absolutely mystified when told of the mistake by Ramsden, now Professor of Bio-Chemistry at Liverpool, who, I believe, by telling him, might have won

money from a fellow-undergraduate, who had bet him sixpence he wouldn't dare tell the 'Burder'.

As ancient and quaint customs may endear a College to the better of us, so these lapses from ordinary procedure enhanced our affection for him. But really to get to know Oxford people, one must get to know them in the Vacation and out of Oxford, away from the petty concerns of Oxford Committees. This was not the case with Burdon-Sanderson: it was as good to know him in Term, as it was to be with him when travelling or on his holidays. Then everything was of interest to him. He 'always showed a special delight in wide space, the swell of hills stretching out to meet the sky, and all that airy freedom which is so indelibly bound up with moorland scenery'. 'In later years there were few things which he found so exhilarating as a tramp over the heather, the enjoyment of which became much enhanced when he had developed his scientific knowledge. As a boy he delighted in the observation of wild animals and in the discovery of wild flowers.' And if all natural phenomena were an enduring joy to him, music, art, literature, and architecture also had each a niche in his affections, especially classical music, which was a great pleasure to him, particularly towards the end of his life.

It was wonderful in what good part he accepted the inconveniences of his absent-mindedness. On one occasion, after a tiring journey from Rome, Lady Burdon-Sanderson and Sir John alighted at Naples railway station. There, unable to find his luggage which had gone astray, rather weary and thoroughly bewildered by the pandemonium of porters, hotel touts, and bawling lazzaroni, I found the tall figure of Sir John dealing out five-franc notes to a rapidly-growing crowd.

A characteristic story of the great man during his Oxford period was told by Lady Burdon-Sanderson. He had recently procured some living specimens of the Electric Cat-fish from the Nile, a fish capable of giving quite severe electric shocks. Without consulting the other members of his family he kept them in the bath—which happened to be the only one in the house—for a whole fortnight, thus emulating the treatment of domestic fish in Rome. 'They swim about our cubilia,' said

Seneca; 'we catch them under our tables.' But a Roman patrician would scarcely have given up his bath to his favourite fish.

George Montague Johnson.

Among the few members of the University who were engaged in the great Naval Battle of May 31, 1916 off Jutland was George Montague Johnson, Surgeon on Sir Robert Arbuthnot's ship, the *Defence*. None of her officers or crew were saved.

Johnson came to Magdalen as a Commoner from Charterhouse in 1897 and read Natural Science. Though not naturally endowed with the gift of readily answering examination questions, he obtained Honours in Physiology in 1901 and became a very sound medical man. After finishing his training at the London Hospital he graduated as B.M. in 1908, and his old friends were glad to welcome him back to Oxford as House Surgeon at the Radcliffe Infirmary. At the outbreak of war he was in Newfoundland in medical practice which, feeling the call of duty, he relinquished. In England, however, as there did not appear to him to be any demand for extra military medical assistance, he marked time by acting as assistant tubercular Officer for East Suffolk under the Senior Officer of Public Health at Ipswich, until the opportunity of joining one of our big ships arrived.

'Always fond of sport and good at games and a keen and successful fisherman and boatman: indeed in the course of his professional duties in Newfoundland he often went out in such weather that the fishermen would be anxiously waiting his return . . . beyond all was his unusual capacity of forming real friendships socially and professionally, and his early death will make him sadly missed by a very wide circle.' [1]

Many will miss his sunny, amiable good nature and his pleasant wit. His end has come in what appears to be one of the greatest episodes in naval warfare. At the same time we also mourn the loss of another officer of the *Defence*,

[1] His portrait appeared in the *Lancet*, June 17, 1916.

Sub-Lieutenant George Paterson, R.N., who, though not an Oxford man, became known to many of us here, when he stayed in College on leave, as the guest of his brother, Captain Jack Paterson.

Charles Herbert George Martin.

Several tributes to the value of Martin's work have been printed in the *Daubeny Laboratory Register*, page 195.

It may now be added that he was one of that small body of Oxford men who from motives of National or rather International service had elected to devote themselves to Zoological Research. The deaths among his fellow workers were exceedingly heavy, heavier than in any other School in the University, to the irreparable loss both of successful traditions in teaching and of the scientific labours of many years. With Martin we mourned Darbishire of Balliol, a pupil of the late Prof. Weldon, the author of the clearest exposition of theories of inheritance of the day; Jenkinson of Exeter College, who united a training in the School of Literae Humaniores with that of the Oxford Zoology School and with the teaching of Prof. Hubrecht of Holland, he was the leading exponent of Vertebrate and Experimental Embryology in Britain; Minchin, Professor of Protozoology, ablest of Oxford Zoologists of his day; Scott of Magdalen eminent for his knowledge of the methods used in Histological investigations; Geoffrey Smith of New College, the only Englishman who was ever honoured by being asked to undertake a Monograph for the Stazione Zoologica of Naples; and Meade Waldo of Magdalen, an authority on the Hymenoptera.

In that most wasteful of all wars, there was no graver instance of Waste than that of the best brains of the best School in the University, for within that School from among men of a particular type, of proved and of exceptional ability, the casualty list was well over 50 per cent.! Similar cases of the squandering of the most precious assets of the country were considered by the Conference of Headmasters who, on December 23, 1915, passed a resolution, 'That very grave loss

to the country is caused by the employment of young students of exceptional mathematical and scientific ability as subalterns in Line battalions.'

Ernest Walling.

Captain Ernest Walling, M.C. (1917), Croix de Guerre (1918), West Yorkshire Regiment, attached T.M.B., was killed in action in France on April 25. Few have put their lives to better use than the quiet, unassuming little Yorkshire boy who came up to Magdalen as an Exhibitioner from Giggleswick School in 1904. He was the son of Mr. George Walling of Ingleton, and the love of his native scars and dales burnt bright within him. He was elected in a good year: Tizard, now Fellow of Oriel, and Carr Saunders were his contemporaries. Walling was a keen and 'sceptical' chemist, always so eager to turn out good work that it was a real pleasure to help him. While still an undergraduate he hit on a new method of separating antimony and bismuth, which it was thought might be of considerable importance. The natural bent of his mind was, however, towards teaching rather than to research. Clifton gave him his first experience in Lent Term 1908, and very instructive was his report on why so few scientific Cliftonians were coming up to Oxford. In April 1910 he accepted a Science Mastership at the Oxford High School, realizing that this would give him the opportunity of making some contribution to science by assisting Dr. H. B. Baker in researches at Christ Church. In 1912 he returned to Yorkshire as senior Science Master at Leeds Grammar School, a position which he held until, at the Nation's need, he took a commission in the 7th Battalion of the West Yorkshire Regiment, being promoted Captain in 1917, and holding the position of Temporary Major soon after.

His last letter home, dated April 24, stated that on the night before, he with five other officers had been decorated in the dug-out at 11 p.m. with the Croix de Guerre by a French General. With characteristic modesty he wrote that he did not know what it had been given for. His Orderly writes that at 10.30 a.m. on April 25, during a severe

bombardment, he was hit on the right side of the forehead and died in less than ten minutes. All the other officers were killed, wounded, or missing. A typical Yorkshireman, he had declared that 'he would never be taken a prisoner by any German'.

Samuel Geoffrey Scott.

Samuel Geoffrey Scott was born in 1875, son of the late Canon S. G. Scott of Havant. Educated at Margate, Clifton, and Magdalen, he took his degree in 1897, finished his medical studies at St. Thomas's Hospital, and qualified B.M. in 1902. His bent had always been towards laboratory work, and, after helping in the Home Office inquiry into ankylostomiasis in Cornwall, he began a very happy married life, and was appointed Demonstrator of Pathology at Leeds in 1903. Here he remained for five years, until he was called to succeed Dr. Gustav Mann as Demonstrator of Physiology with charge of the Histological Laboratory at Oxford. No selection could have been more appropriate, both for the man and for the office. Scott had been a close friend and pupil of Mann's, and was full of that fine tradition for making Histology something more than minute anatomy, which is familiar to Oxford students for the last twenty years. He worked happily and enthusiastically for eight years; when he could be spared from teaching, he joined the R.A.M.C. in 1916, and, partly at Netley and partly in France, did his share of the work. A sudden attack of pneumonia carried him off in Italy on January 6, 1918.

'Scott was essentially a histologist, and he envisaged his science along the lines which will no doubt lead to its revival in this country from the comparative neglect into which a soulless micro-anatomy had rather deservedly brought it. His scheme was to graft into this a generalized micro-chemistry in a wide sense, and if he planned on a pretty generous scale, it was part of his genial trust in the goodness of the way in which the world is arranged. His published work bears no relation to his long laborious days; but his store of learning on anything histological was always at the disposal of his

friends, and he knew that the best way to get any one to try a new stain is to give him some of it. He was certainly a very good teacher. Pupils of his who afterwards came to morbid histology were apt to ask rather awkward questions about methods of fixation and such-like, instead of wondering in a bewildered way whether the little black dots were nuclei, and what the thin red line might be. It seems impossible that Scott should have had an enemy.' (A. E. B.—Obituary Notice with Portrait, *Journ. Path. and Bact.* xxiii.)

George Bennett.

Lieutenant George Bennett fell a victim to the misguided and lamentable massacre of Sunday, November 21, 1920 in Dublin. Born at Batavia in Java, and a Sherborne boy, he was elected a Demy of Magdalen in Natural Science in 1911. His Head Master, who was also his special friend, recognized in him something unusual, something of genius or at any rate rare gifts and tastes from the first. He began while at school the study of Kant and Hebrew. Of somewhat poor physique, and with one arm slightly paralysed, he had a keen and courageous spirit coupled with an unusual temperament. His spirit made him a leader and a successful Head of the School. At College at first he disappointed his friends, and perhaps himself, and indeed his career in the Schools was a failure. But he made good friends and cultivated interesting tastes. He was attracted by the mysteries of magic and the intricacies and subtleties of Foreign Affairs, and was a member of a club called the Granville Club, founded just before the War, for the pursuit of the study of the latter. When the War came his physique was at first against him, and he had some difficulty in getting a billet. He went to Egypt in 1915 on civilian war-work. Then returning, he enlisted as a motor-driver in the A.S.C. rather than do nothing. He bribed, it is said, a sergeant to enlist him, after being several times rejected. By and by he got transferred to the O.T.C., and then was sent back with a commission to the A.S.C. At last, after serving with distinction in France and being mentioned in

Dispatches, he was found his proper job and was sent on Intelligence service to Holland. It was on similar work that he was employed in Ireland when his career was the other day so sadly and suddenly cut short. 'I have tried to do too many things,' he wrote, when he was a boy at school, 'and I know well the truth of Goethe's words in *Wilhelm Meister's Apprenticeship*, "Happy the man who early learns the immeasurable distance between his wishes and his powers."' He did not always seem modest or amiable, but he was essentially so; modest, amiable, chivalrous, and devoted to causes and persons who engaged his underlying sympathy, and brave even to quixotry.

'It was not a mere love of adventure,' writes a Christ Church friend who knew him well, 'which took him to Ireland. He was a Catholic and a Home Ruler, and loved the country and its people, and again he gave up a good position in the City to do what he could for Ireland. That is the irony of the tragedy.' H. W.

Owen Guy Parry-Jones.

Captain Owen Guy Parry-Jones, R.A.M.C., elder son of Dr. and Mrs. Parry-Jones, Full Street, Derby, who died of wounds on September 29, was born in 1887. He was educated first at a preparatory school at Bournemouth, and then at Sherborne School, where he reached the sixth form and was school prefect, but was perhaps more distinguished for his musical gifts and athletics. He was a prominent member of the Rugby XV, won the steeplechase, and was a sergeant in the O.T.C. He went up to Oxford with a choral scholarship at Magdalen College, became captain of the College XV, and played many times for the University. After taking his B.A. degree he entered at his father's old school, Guy's Hospital, where he was for five years a member of the Rugby XV, which won the Hospital Cup four years out of five. He also played for Kent, and was a member of two teams which went to France and Austria respectively. In 1913 he accepted a commission in the Special Reserve of Officers, and was

called up when war broke out, when he was just on the eve of qualifying as a medical man, and was gazetted to the Lancashire Fusiliers. He served with them at their depot for five months, and then in view of the shortage of doctors was given a month's leave and became M.R.C.S. and L.R.C.P. in January 1915, being at once gazetted lieutenant in the R.A.M.C. Promoted captain in May 1915, he went out to the front in July 1915, and had served continuously ever since.—*Times*, Oct. 16, 1916.

Alan Gordon Harper.

In Lieutenant Alan Gordon Harper, who was killed in action on the Western front, the Empire has lost a brave son and science a most promising student. His colonel wrote that he was found dead beside one of his guns on June 1, having been killed instantaneously. It was the death he would have chosen.

The second son of Mr. Peter Harper, of Bromley, Kent, Alan Harper came to Magdalen from Dulwich College as a Demy in 1908, with that rare possession, a mind already made up. 'I have not yet decided', he then wrote, 'what career I shall choose, but of course it will be one in which Botany is the main subject required.' Nor did he ever swerve from his purpose till the higher call came, when, with the same singleness of aim he applied himself to the arduous and less congenial duties of a military life.

After his Final Schools in Botany he successively undertook the duties of assistant to the Professor of that subject at Bangor University, and to the Sibthorpian Professor of Rural Economy at Oxford (1913). During 1914 he acted as Professor at the Presidency College in Madras where he effected important changes in the curriculum. Professor Harper's published work dealt principally with forestry problems, such as the effects of defoliation upon the growth and structure of the wood of the larch, the growth of the ash (a research undertaken in conjunction with Professor Somerville), the formation of autumn wood in conifers, and the shoots and needles of the pine tree.

He was a most diligent worker and one whose studies were part of his life, for he would interweave his scientific interests with the pleasures of his holidays in the open. He went for walking tours in Scotland, fishing, searching for alpine plants on the Cairn Gorm mountains, and, when at Bangor, for rare mosses in North Wales. His most interesting and most fruitful tour was in the highlands of Southern India when, starting from Tellichery on the Malabar Coast, he made his way to Mercara and Mysore. On this trip he induced natives who 'climb like cats' to bring down flowers and fruits from lofty trees hitherto only known to Oxford foresters by specimens of timber.

Gifted with tact, with a wide sympathy, and with the rare quality of only seeing what is best in people, he was so successful with his native pupils that the Indian Education Office offered him a permanent position in that service. This brilliant opening he refused; for war had broken out, and though he was in the motor cyclist section of the Southern Provinces Mounted Rifles at the time, it was not in him to be content with only a part-time service at such a crisis. He decided to return to England and enter the army; he soon obtained his commission in the Royal Field Artillery and, his training over, was sent to France where, 'until injured in the desperate fighting for Longueval last summer when he had to come home for a month or two, he had rarely been beyond the range of shells for two years'. For his services he was awarded the Military Cross.

The military training and habit of command removed the diffidence of manner that had masked his great strength of character. And here again the power he possessed of seeing the best in his men aroused in him a heartfelt and paternal affection for them. His capacity was recognized by the authorities. He gained the top marks in the examinations of the 18-pounder classes. In the official Report on the examination was written: 'A very capable officer and should go far; wasted in a D.A.C. with his knowledge of gunnery subjects. A good rider.'

But though his ability and character might ensure him

a successful military career, it was only a sense of duty that could make him continue a soldier, for his inclinations were for Oxford and the studious life. After a flying visit to us he wrote: 'I hardly knew I cared for Oxford so much or had been so happy there. I suppose one's sense of true perspective gets a better chance when one stands back a little as it were, and sees Oxford from outside. The most interesting place just now is the Somme.'

He gave a practical form to his affection for his University by taking his B.Sc. and M.A. degrees: no small strain on the slender resources of a young lieutenant.

His death deprives us of one of our most efficient young botanists. His ability, conscientiousness, and the wide experience he had gained in travel equipped him in a remarkable degree for that work of scientific reconstruction in forestry and agriculture to which he must presently have been called.

Oxford Magazine, June 15, 1917.

Francis Herbert Hodgson.

Captain Francis Herbert Hodgson, R.A.F., was the younger son of Mr. C. H. Hodgson of Sherborne School, the death of whose elder son was lately recorded in *The Times*. Captain Hodgson was born March 11, 1896, educated at Connaught House, Weymouth, and at Harrow School, where he gained an Entrance Scholarship, 1910, and the Rondell Scholarship, 1914. He came to Magdalen as a Science Demy in October 1914 with the intention of reading medicine, the training for which he started at St. Mary's Hospital in the summer of 1915. After a course at Beatty's Flying School at Hendon in October, he received a commission in the R.F.C. on February 23, 1917. Training at Brooklands and Croydon followed; he graduated as pilot on May 27, 1917, went overseas to France on June 8, 1917, and served with No. 15 Squadron R.F.C.

On September 6, 1917, he was severely wounded in an air-fight with a Fokker while on a bombing expedition. He was employed at Oxford (Port Meadow) during convalescence and returned to France in June 1917 where he served till May 1918, being mentioned in dispatches in February.

After a period in Cambridge for a staff course, he was offered a staff billet, but in October, at his own urgent request and that of his comrades in France, he returned to the front. He was slightly wounded on November 4, but did not leave his squadron, and was flying over the German lines at the time of the Armistice. He had just been appointed to command an Independent Flight of Bristol Fighters to accompany the Army of Occupation to Germany, when he was accidentally killed in a trial flight on November 19 at Elincourt. He was an exceptionally gifted officer, as he would undoubtedly have proved himself in civil life, whether as a doctor or as a Science master, to which profession his mind had latterly turned. The Major in command of his squadron wrote, 'He was of course the most popular officer in both — and — Squadrons, and a most gallant officer who led and all followed'.

(*The Times*, Nov. 27, 1918, and his own information.)

APPENDIX A

The Meteorological Record

The value of the observations of the Temperature of the River Cherwell has been recognized by the British Association and by other public bodies. Since 1906 copies of these observations have been supplied to the Director of Water Examinations at the Chemical and Bacteriological Laboratories of the Metropolitan Water Board, and in January 1924 the present Director, Sir Alexander Houston, K.B.E., wrote that he attaches great importance to the records of the Magdalen water temperatures, which have been sent him for so many years, adding that 'their interest is of a progressive character, so I earnestly hope there may be no break in their continuity'.

Average Oxford Rainfall, 1860–1865 = 25·16 inches.

Rain Gauge { Diameter of Funnel, 5 inches. Height above ground, 1 foot. Height above sea-level, 186 feet. (at top)

1915.

	Rainfall in inches.			Temperature.		
	Total depth.	Greatest fall in 24 hours.	No. of rainy days.	Max. in shade.	Min. exposed.	Mean River Cherwell.
Jan.	2·84	0·79	19	52°·0	25°·5	38°·6
Feb.	3·08	0·40	20	51°·5	22°·0	39°·8
Mar.	1·20	0·50	12	58°·5	20°·0	42°·8
Ap.	0·78	0·32	10	69°·0	26°·5	48°·2
May	3·27	1·01	10	73°·5	27°·5	57°·0
June	1·49	0·53	10	82°·0	35°·5	63°·5
July	3·93	0·90	19	78°·5	43°·5	63°·1
Aug.	1·31	0·53	16	76°·0	41°·0	64°·0
Sept.	2·68	1·52	7	75°·5	29°·0	59°·4
Oct.	2·31	0·83	11	64°·0	26°·5	50°·2
Nov.	2·08	0·86	8	56°·0	16°·0	38°·7
Dec.	4·41	0·69	23	56°·0	23°·0	40°·6
Total	29·38	1·52	165	82°·0	16°·0	

Monthly river mean for year = 50°·49

1916.

	Rainfall in inches.			Temperature.		
	Total depth.	Greatest fall in 24 hours.	No. of rainy days.	Max. in shade.	Min. exposed.	Mean River Cherwell.
Jan.	1·37	0·54	12	57°·0	26°·0	43°·7
Feb.	3·60	0·67	19	53°·5	22°·5	39°·3
Mar.	5·08	1·39	14	56°·0	22°·0	38°·7
Ap.	0·88	0·31	11	72°·0	23°·5	49°·2
May	1·83	0·41	18	78°·5	23°·0	57°·0
June	1·61	0·26	16	70°·5	34°·0	57°·8
July	1·59	0·84	13	81°·0	41°·0	62°·7
Aug.	3·81	1·26	15	81°·0	39°·5	65°·0
Sept.	0·73	0·32	13	70°·5	34°·0	56°·7
Oct.	3·46	0·67	24	68°·5	27°·5	53°1
Nov.	2·94	0·77	14	57°·5	22°·0	44°·0
Dec.	2·73	0·73	13	54°·5	14°·0	36°·4
Total	29·63	1·26	182	81°·0	14°·0	

Monthly river mean for year = 50°·30

1917.

Jan.	1·43	0·33	14	53°·5	19°·5	36°·5
Feb.	1·21	0·29	11	50°·5	4°·0	34°·8
Mar.	1·49	0·32	20	56°·5	19°·0	39°·8
Ap.	1·27	0·23	14	66°·5	21°·5	45°·0
May	1·94	0·67	11	78°·5	28°·5	58°·6
June	2·22	1·60	10	88°·0	38°·5	65°·1
July	3·53	1·17	11	79°·0	40°·5	64°·2
Aug.	3·46	0·95	21	75°·0	43°·0	61°·7
Sept.	1·61	0·65	11	72°·0	39°·0	59°·3
Oct.	3·99	0·69	20	65°·5	25°·0	47°·8
Nov.	0·64	0·14	12	59°·5	23°·0	45°·2
Dec.	0·88	0·35	11	52°·5	17°·0	36°·2
Total	23·67	1·60	166	88°·0	4°·0	

Monthly river mean for year = 49°·52

1918.

	Rainfall in inches.			Temperature.		
	Total depth.	Greatest fall in 24 hours.	No. of rainy days.	Max. in shade.	Min. exposed.	Mean River Cherwell.
Jan.	2·74	1·26	12	55°·5	16°·0	37°·5
Feb.	1·00	0·15	12	58°·0	20°·0	43°·5
Mar.	0·60	0·24	12	65°·5	20°·0	43°·5
Ap.	3·27	0·95	18	65°·5	25°·5	46°·8
May	1·77	0·36	9	81°·0	34°·0	58°·4
June	1·07	0·32	13	78°·0	37°·0	61°·1
July	4·12	0·63	16	77°·5	41°·0	63°·6
Aug.	0·99	0·36	9	82°·0	41°·0	64°·5
Sept.	4·58	1·13	24	71°·0	28°·5	56°·9
Oct.	1·80	0·45	22	62°·5	31°·0	49°·7
Nov.	1·94	0·47	13	58°·5	21°·0	43°·3
Dec.	1·99	0·29	24	57°·5	22°·5	44°·9
Total	25·87	1·26	184	82°·0	16°·0	

Monthly river mean for year = 51°·14

1919.

Jan.	2·85	0·71	22	52°·5	21°·0	37°·5
Feb.	2·10	0·69	14	53°·0	15°·0	36°·0
Mar.	3·76	1·01	22	57°·5	23°·0	40°·8
Ap.	2·21	0·83	16	67°·5	23°·5	45°·4
May	0·40	0·30	4	76°·5	34°·5	58°·4
June	0·89	0·24	9	81°·0	37°·5	62°·9
July	2·15	0·74	12	76°·5	40°·5	60°·0
Aug.	2·90	0·62	13	82°·5	38°·0	64°·3
Sept.	1·23	0·35	12	77°·5	27°·5	57°·8
Oct.	1·37	0·66	12	62°·0	26°·0	45°·8
Nov.	1·16	0·31	19	55°·5	18°·5	39°·0
Dec.	3·82	1·04	25	57°·5	22°·5	40°·0
Total	24·84	1·04	180	82°·5	15°·0	

Monthly river mean for year = 48°·99

1920.

	Rainfall in inches.			Temperature.		
	Total depth.	Greatest fall in 24 hours.	No. of rainy days.	Max. in shade.	Min. exposed.	Mean River Cherwell.
Jan.	2·02	0·35	20	56°·0	22°·5	41°·0
Feb.	0·68	0·34	11	58°·0	22°·0	41°·5
Mar.	1·56	0·40	16	65°·0	21°·0	45°·4
Ap.	2·81	0·44	25	63°·5	30°·0	49°·4
May	1·62	0·37	14	80°·0	31°·0	56°·3
June	3·38	1·22	11	75°·0	35°·5	62°·6
July	4·23	0·70	21	73°·0	40°·5	61°·1
Aug.	1·05	0·45	8	73°·0	37°·5	60°·1
Sept.	1·55	0·27	13	72°·5	35°·0	57°·4
Oct.	2·08	1·13	11	69°·5	27°·0	52°·6
Nov.	0·88	0·30	12	58°·5	21°·5	43°·3
Dec.	2·23	0·32	22	55°·5	16°·5	39°·5
Total	24·09	1·22	184	80°·0	16°·5	

Monthly river mean for year = 50°·85

1921.

Jan.	2·30	0·39	17	56°·0	24°·0	44°·3
Feb.	0·56	0·29	6	55°·5	22°·2	40°·8
Mar.	0·85	0·13	15	62°·0	24°·2	46°·4
Ap.	0·91	0·28	12	71°·0	28°·0	50°·2
May	1·13	0·29	18	76°·0	28°·0	59°·5
June	0·35	0·18	6	83°·5	39°·0	63°·1
July	0·20	0·08	4	88°·0	42°·0	68°·5
Aug.	1·51	0·63	15	79°·0	39°·0	63°·4
Sept.	1·67	1·09	8	79°·0	33°·0	59°·6
Oct.	1·18	0·42	10	75°·0	27°·5	56°·2
Nov.	2·02	0·48	13	59°·5	20°·0	41°·2
Dec.	1·28	0·25	16	56°·5	22°·5	41°·5
Total	13·96	1·09	140	88°·0	20°·0	

Monthly river mean for year = 52°·89

1922.

	Rainfall in inches.			Temperature.		
	Total depth.	Greatest fall in 24 hours.	No. of rainy days.	Max. in shade.	Min. exposed.	Mean River Cherwell.
Jan.	2·29	0·34	22	59°·0	21°·0	38°·0
Feb.	2·37	0·35	16	59°·0	16°·5	39°·0
Mar.	1·70	0·32	15	60°·5	23°·0	42°·8
Ap.	2·61	0·48	19	66°·0	22°·0	45°·1
May	1·60	1·08	8	85°·5	28°·0	59°·8
June	1·30	0·47	8	81°·5	37°·0	64°·1
July	3·60	1·14	16	74°·5	42°·0	61°·1
Aug.	5·11	2·82	16	70°·5	39°·0	60°·4
Sept.	1·26	0·28	12	70°·5	35°·0	57°·4
Oct.	0·56	0·15	12	66°·0	26°·5	48°·6
Nov.	1·10	0·42	11	56°·5	22°·0	41°·3
Dec.	2·50	0·50	15	53°·0	27°·0	41°·3
Total	26·00	2·82	170	85°·5	16°·5	

Monthly river mean for year = 49°·91

1923.

Jan.	1·52	0·54	12	55°·0	22°·5	39°·3
Feb.	3·35	0·44	24	57°·0	25°·0	42°·6
Mar.	2·66	0·54	19	67°·0	26°·0	44°·2
Ap.	2·19	0·55	14	64°·0	27°·0	48°·4
May	1·26	0·21	18	79°·5	30°·5	54°·2
June	0·39	0·18	7	75°·0	31°·0	59°·1
July	1·36	0·47	11	90°·8 [1]	43°·0	68°·0
Aug.	3·10	0·89	13	83°·0	39°·5	64°·0
Sept.	2·00	0·89	13	73°·0	36°·0	56°·8
Oct.	3·87	0·83	23	65°·0	31°·0	50°·5
Nov.	1·20	0·48	10	58°·0	18°·0	39°·9
Dec.	2·34	0·41	18	51°·0	21°·0	38°·0
Total	25·24	0·89	182	90°·8	18°·0	

Monthly river mean for year = 50°·42

[1] This is the second highest maximum temperature in the shade recorded here. On the 12th of July the maximum was 90°·3.

The previous highest observed maximum temperature was 90°·5 on the 9th August 1911.

APPENDIX B

RESEARCHES CARRIED OUT IN THE DAUBENY LABORATORY DURING 1915–23; WITH TITLES OF PUBLICATIONS BASED THEREON.

1915.

55. **C. H. Manley.** The Densities and Refractive Indices of the Leamington Spa Water.
The Analyst, Sept. 1916.

56. **R. T. Gunther.** The Daubeny Laboratory Register.
8vo, Oxford, 1916.

57. **R. T. Gunther.** A Frost Thistle: an effect of freezing.
Nature, 11 Jan. 1917.

58. **R. T. Gunther.** Report on Agricultural Damage by Vermin and Birds in Norfolk and Oxfordshire.
8vo, Oxford, 1917.

59. **J. J. Manley.** On the Use of Highly Attenuated Wires for Platinum Thermometers.
Printed for *The Daubeny Register*, 1919.

60. **J. J. Manley.** Balance.
Article in New Edition of *Thorpe's Dictionary of Chemistry*. 1921.

61. **J. J. Manley.** On the Insulation of Highly Attenuated Wires in Platinum Resistance Thermometers.
Phil. Mag., xliii, Jan. 1922.

62. **J. J. Manley.** The Use as a Drying Agent of Phosphoric Oxide treated with Ozone.
Trans. Chem. Soc., cxxi, 121, 1922.

63. **J. J. Manley.** The Protection of Brass Weights.
Phil. Mag., xliv, Nov. 1922.

64. **J. J. Manley.** A Defect in the Sprengel Pump: Its Causes and a Remedy.
Proc. Phys. Soc., xxxiv, Apr. 1922.

65. **C. W. Brisley.** Analysis of Felspars and of sundry Rocks and Minerals brought back by members of the Oxford Expedition to Spitzbergen.
1921–2.

66. **C. B. Sheppard.** Investigation of the secondary chemical reactions which take place when equivalent weights of silver nitrate and ferrous sulphate solutions, both as neutral as possible, are mixed.

Mich. 1921–Sept. 1922.

67. **R. T. Gunther.** Early Science in Oxford. Vols. i and ii.

8vo, Oxford, 1920–23.

68. **J. J. Manley.** On the Production of Coloured Flames for use with Spectrometers and Polarimeters.

Phil. Mag., xlv, Feb. 1923.

69. **J. J. Manley.** A Further Improvement in the Sprengel Pump.

Proc. Phys Soc., xxxv, Apr. 1923.

70 **R. T. Gunther.** Elephant Tusks found in Oxford in Feb. 1922.

Oxford Journal Illustrated, 10 Jan. 1923.

71. **R. T. Gunther.** Ursus anglicus, a new species of British Bear.

Ann. Mag. Nat. Hist., April, 1923.

Mr. Manley reports that the following researches are approaching completion. The whole of the necessary experimental work for papers 1–5 has been done: that for papers 5–7 is in an advanced stage.

1. A New Form of the Sprengel Pump.

In this form the gases absorbed by the interior surfaces of the glass walls and by the mercury used for operating the pump, are electrically freed and continuously carried away by an auxiliary Sprengel pump.

2. An Automatic Flame Feeder for use with Spectrometers and Polarimeters.

The essential part of this feeder is a rotating circle of platinum wire which, when in use, is uninterruptedly supplied with the required salt solution over a region which is on the point of entering a large and powerful Bunsen flame.

3. Some Additional Devices for Refined Weighing.

The new devices are obtained chiefly by means of a system of palladium mirrors by Hilger and an auxiliary rider, weighing 1 mgrm. only, and working upon a stretched platinum wire. With these

additional equipments, J. J. M.'s balance is now easily capable of detecting the $1/20^8$ part of its load of 200 grms.

4. Simplified Vacuum Tubes for Spectroscopic Work.

In these vacuum tubes the usual internal electrodes of platinum and aluminium are replaced by others which are wholly external. Also, by another device, the light available for the spectrometer is increased nearly 100 %.

5. Determination of the Rates of Cooling for Pyknometers of Various Forms, charged with different liquids.

The cooling curves which are for a temperature-range of 4° C. above the temperature of the enveloping bath, are remarkable for their uniformity and smoothness. The data were obtained with the aid of 2 platinum resistance thermometers reading to 1/1000° C. So far it has been impossible to discover a mathematical expression for the curves.

6. A Differential Gauge for Measuring Low Gas Pressures.

In this gauge two barometric tubes are suspended, the one from one pan of a heavy precision balance, and the second from the other pan. The barometric columns are for the most part contained within Sprengel pump tubing; the upper portions only being wide and having the diameter of 35 mm. These wide portions contain the upper limits of the mercurial columns and this being so, very small changes in pressure produce considerable changes in weight. One tube is, by means of its own Sprengel pump, maintained in a highly exhausted state: it serves as a standard of reference. The other tube is sealed to any apparatus containing gas whose pressure p we may desire to measure. The values of p may vary within the limits 0 and 60 mm. The barometric tubes are connected with their respective pumps and apparatus by means of fine and long glass capillary tubes placed horizontally. The flexibility of the capillary tubes is such that they readily respond to a weight of 1 mgrm.

7. Electrical Variometers for measuring Differences in the Flow of Air Streams. (With Dr. Vernon).

These Variometers,[1] of which six different types were designed and constructed, are for measuring deviations from an intended perfectly uniform flow of air. Extended tests prove that several of the instruments instantly detect and show the extent of fluctuations in air streams the velocity of which may be either great or exceedingly small. Dr. Vernon will be using a completed variometer for examining ventilation in workshops and factories.

The results of his impending investigations with the variometer,

[1] Renamed 'Met-anemometer' 11 Feb. 1924 (J. J. M.).

will in all probability affect the welfare and general comfort of many thousands of workers.

At the same time Mr. Gunther was intermittently engaged upon the continuation of the (8) geological researches, already mentioned on p. 328, the working up of the materials for which was one of the obligations of his Research Fellowship.

These materials included:

Maps, Notes, and MSS. for Archaeological and Geological work on Mediterranean Lands.

Photographs and Negatives in connexion with ditto.

Rock specimens.

Collection of Books on Topography and Geology of Naples and South Italy.

The two moves from shelves and cupboards devoted to particular subjects which the geological and other papers, books and collections have suffered, and their separation from the materials on which the research depended, have resulted in a dreadful confusion, which has materially hindered the prosecution of *all* research work.

Among private scientific collections and specimens stored in the Laboratory were

9. Series of specimens of *Phyllirhoe bucephala* specially prepared for a reinvestigation of the histology of a transparent, luminous pelagic form.

This series was probably the most complete in Britain.

10. Specimens of the mid-water Plankton fauna collected by the late George Murray in the Intermediate Waters of the N. Atlantic.

The collection included the largest specimens of *Chaetognatha* that had ever been described.

11. A collection of *Coelenterata* from the East Coast of Africa, sent to be reported on by the Department of Agriculture of the Cape of Good Hope.

This fine collection included several new species of Medusae and a *Siphonophore* in which Mr. Gunther discovered what he believes to be a new type of Balancing Organ, that has not been described.

12. Co-type specimens of *Steneosaurus* vertebrae from the Kimeridge Clay of Shotover.

These are the first fossils in which colour-prints of blood-vessels have been observed. These specimens have now disappeared.

13. A collection of *Diatomaceae*, said to be the best in Oxford.
14. A large collection of *Microscopic preparations* of all kinds, in six cabinets.
15. A collection of bones of the *Dodo* from Mauritius.
16. A collection of *Ear bones* of Vertebrata and of *Otoliths* of Fishes.

Among the papers the following were of public or College interest:

Papers relating to the History of Dr. Daubeny and of his Laboratory.

Papers relating to the Edward Chapman Trust.

Papers and notes relating to the History of the Physic Garden.

Papers and notes relating to the Architecture of Magdalen College.

Minutes relating to Scientific studies in the College and the University.

These are but a few of the important and irreplaceable materials for study and research that have been displaced, and by being displaced have been depreciated in scientific value. They and many other collections were accumulated in the Daubeny Building in the firm belief that the College would never interfere with the Daubeny Trust or with the covenants that had been given by its officers in conformity with the spirit of that Trust. It may also be urged that it is a doubtful policy suddenly to close down an Institution in which good work has admittedly been done, even before the ink is dry on the sheets announcing the results of researches. Every author knows that for several months after the publication of a research, he is a prey to correspondents who may want to ask questions about it: and much may hang on the result. So in a well-equipped scientific Institution, space is necessary not merely for the researches in progress, but also for a reasonable period after publication, for the storage of papers and evidences that may be required at short notice for answering the questions that always arise.

APPENDIX C

The Collections of Apparatus.

Chemical Glass.

The old Chemical Glass, described on pp. 182–8, has been figured in the Appendix to *Early Science in Oxford*, pt. 1, Chemistry, 1920, and, by an Order of the College, a certain number of duplicate specimens and of pieces of chemical apparatus of large size have been deposited on loan in the Wellcome Historical Medical Museum at 54 Wigmore St., London, W., where they form an imposing addition to the important series of chemical exhibits already there. The rarity and value of these ancient glass instruments cannot be over-emphasized.

The 100-gramme Standard Weight, 1907. See p. 181.

In August 1923 an examination of the standard 100 grm. Platinum-iridium weight by Paul Bunge was made, and as a result an irregular flaw or crack was discovered on its side. Advice was sought from the National Physical Laboratory. The authorities in reply to my letter wrote 'We are interested in your statement that your weight has developed a crack. Have you detected any change in the mass of the weight? We should like to see it if you will send it to us as you suggest.' Accordingly the weight was sent; and on Sept. 5 they wrote 'With reference to your 100 grm. Pt-Ir weight, we regret that we are unable to suggest any very probable explanation of the crack (which you say has developed only recently) from an ordinary examination.

'If you wish it however, we could pass the weight to our Metallurgy Department when, after local polishing and etching, microscopical examination might give some indication of the probable cause of the crack. . . .

'We do not think the cause you suggest is at all probable, for crystallization would be accompanied with decrease in volume.

'The weight is evidently in a very unreliable condition, moisture from the humid atmosphere or other foreign matter may find its way into the crack. We think your best course would be . . . to obtain another weight.'

After some further correspondence, the authorities of the N. P. L. were requested to make a microscopical examination. When this had been done the following report was received:—

On the Microscopical Examination of a Fractured Platinum Weight submitted by J. J. Manley, Magd. Coll., Oxford.

Ref. Letter 30/8/23.

A microscopical examination has been made of the fractured 100 grm. platinum weight.

Examination of the surface of the weight as received, showed that the flaw consisted of several cracks. These cracks appear to have been caused by the eruption of a wax-like substance from beneath the polished surface of the weight. The general appearance of the fracture suggested that the substance had been entrapped in the weight beneath a very thin layer of metal which had been 'lapped' over it, the trapped substance having subsequently burst through the skin of metal which enclosed it, leaving the thin edges of the cracks turned up. The substance in the cracks was soft and had the appearance of white wax. It was not dissolved by benzene, and was discoloured but did not appear to melt on heating the weight up to 200° C. It was not found possible to photograph the cracks satisfactorily as received.

A small flat was then made on the side of the weight and polished for high power microscopical examination. The appearance of the fracture is illustrated in figure 1 at a magnification of 100 diameters. It will be seen that the metal in the neighbourhood of the fracture has been severely distorted by work; the cracks appear to have been flaws in the original ingot which have been closed up by subsequent pressing or drawing operations. The appearance of the metal does not suggest that the fracture is a 'season crack'.

In conclusion, it seems evident that the cracks in the weight were flaws in the original ingot which have been closed up during manufacture and 'lapped' over during the final polishing. Possibly some lubricant used during manufacture was trapped in the flaws, and being expanded by heat or corrosion, has subsequently burst through the polished surface of the weight making the flaw noticeable. Polishing and etching has resulted in the loss of about ·025 grm. of platinum from the weight.

(Signed) J. E. PETAVEL

Date: 22nd Oct. 1923. D. H.

The experience and results detailed above clearly show that it is unwise to rely upon a supposed unchanging character of one weight alone: and so in Sept. 1923 a different plan was inaugurated, and an order for 3 Pt-Ir weights having the respective values of 50, 20, and 20 grms. was placed with Messrs. L. Oertling of Turnmill St., London. These weights which were received in Dec., were given the same form as the English standard pound of platinum constructed under Professor Miller's supervision (see *Phil. Trans.* 1856). Using the new weights in conjunction with J. J. M.'s standard 10 grm. Pt-Ir weight which is rectangular in form and made by Bunge, we have an available new standard mass of 100 grms., replacing that which had become defective and therefore useless for its purpose.

In Jan. 1924 the 3 new weights and J. J. M.'s 10 grm. weight, were standardized at the N. P. L. (*a*) singly and (*b*) collectively as one individual mass of 100 grms. Soon after they were received from the N. P. L., they were inter-compared by J. J. M., who for that purpose made use of his most recent form of precision balance. By re-determining from time to time the relative values of the several weights it will be possible to detect with certainty any appreciable differential imperfections developing in such a way as to effect an apparent change in mass. To guard against errors not differential in character, it will be necessary to have one weight, say that of 50 grms., periodically re-tested at the N. P. L. In this way it is believed that our future standardizations and weighing will be rendered reliable and accurate.

J. J. M.

A Half-horse-power Electric Motor was installed in the workshop in Lent 1921, so that it might drive either the large lathe acquired in 1916, or the Willett lathe of 1911, or both at the same time. For this purpose a small counter-shaft was introduced. The fixing, &c., was done by Professor Townsend's assistant, Mr. G. A. Bennett.

APPENDIX D

i. Additions to the Bibliography of Dr. Daubeny.

Although it was no part of our plan to include a biography of the founder of the Laboratory, a work that we felt unequal to, it was impossible not to allude to his more notable services to Science, and more especially to Science in Oxford. These further Additions should be appended to his Bibliography (pp. 53, 189).

1839, 11 March. An Address to Members of Convocation on the decreased attendance on Professors' lectures.

1845. On the Thirty-nine Articles. A letter to the *Oxford Herald.*

1849–50. Syllabus of a course of lectures on Inorganic Chemistry.

1851, 28 Nov. Statement respecting the money spent upon the Botanic Garden.

1855, May. A paper urging the sanction by Convocation on 8 May of the proposed contract for the New Museum. Signed, 'A Member of Convocation'.

1856, 21 Feb. A paper on the pecuniary maintenance of the Botanic Garden.

„ 18 March. A letter to Members of Convocation on the same subject.

1865. Letter appended to W. Tuckwell's Practical Remarks on the teaching of Physical Science in Schools.

1866. On the dependence of Ozone on the direction of the Wind. *Transactions of the Devonshire Association*, p. 143.

1904. *Daubeny Redivivus*: An account of Dr. Daubeny by Maxwell Masters appeared in the *Gardener's Chronicle*, 16 April 1904.

ii. Extract from Dr. Daubeny's Will.

Dr. Daubeny's Will begins with the clause already printed on page 300, and continues with the clauses printed *in extenso* on pages 18 and 19, and again abstracted on pages 302–303.

And of the remainder of the Will the following is an abstract:—

I beg it to be understood that all my books not noted as Medical Classical Scientific or Botanical should be classed under the head of Belles Lettres. The catalogue of my Library which will be found in my drawing room will explain the principles of the arrangement.

To Sister Caroline *w.* of Rev. Hen. Richards of Horfield co. Glos. £100 stock; to Rev. Leonard Jenyns late of Swaffham co. Cambs £100 stock; to the Rev. Frederick Bulley President of Magdalen College £100 stock; to the Rev. John Filmer Anstey of Ampney Crucis, co. Glos. £100 stock; to godson Augustus *s.* of late Rev. Baden Powell Savilian Professor of Geometry in Oxford £10; to Wm Baxter the younger, of the Botanical Gardens in Oxford £200 stock; to my Assistant John Harris £100 and also my second best Microscope with its appliances; to my housekeeper Susannah Mills £100 stock; to John Pillinger of Oxford, one of the Yeoman Bedels of the University £10; to servants living in my service at my decease (except Susannah Mills and John Harris) £10; to Margaret, *w.* of said Frederic Bulley and to Anna Maria Daubeny, *das.* of brother Rev. Edward Daubeny £1000 stock apiece; to Matilda Croome and Emily Croome, *das.* of late bro-in-law Rev. John Croome dec. £1000 stock apiece; to John Croome, *s.* of said John Croome dec. £2000; to nephew Edward Richards late Capt. in Somerset Militia £1500 stock; to niece Margaret Anne *w.* of Robert Henry Daubeny Esq. £1000 stock; to niece Carcline *w.* of said J. F. Anstey £1000 stock; to exors. £1000 stock on trust to pay dividends thereof to niece Helen *w.* of Rev. George Richards for life, and after her dec. to a person named by her by Will, or to her next of kin exclusive of her husband; to exors. all my MSS and direction to pay for publishing at least one 8vo volume of my Works with a short memoir for which materials will be given and I direct them to appoint some proper person to be the Editor to whom I give £100 for his trouble; to Chancellor, Masters and Scholars of the Univ. of Oxford all my Botanical Books and the portrait of myself, in trust to stand possessed thereof for the use and benefit of the Professor of Botany for the time being in the said University and his successors for ever; Exors. to retain my statuette of Dalton and give it as a prize to the first member of Magdalen College after my dec. who gains a I Class in Natural Science; Exors. to retain my marble bust of the Young Augustus and give it as a prize

to first member of Magd. Coll. after my dec. who shall gain the Newdigate Prize Poem; Exors. to offer Prof. Phillips any Geological Diagrams and Geological Maps which may be found either in my house or in the Lecture Room opposite and which he may deem useful for illustrating his Lectures; I give all my Medical books and the portrait of Boerhaave by Peter Boll to nephew James Daubeny one of the sons of *bro.* Rev. Edward Daubeny; all Spanish, French and Italian books to nieces equally divided between them; classical and miscellaneous books not otherwise disposed of to nephews Thomas and Robert Daubeny, *sons* of bro. Rev. Edward Daubeny; picture of the Virgin from Murillo to Rev. Frederick Bulley; picture by her bro. John Croome to niece Margaret Anne *w.* of Robert Henry Daubeny; picture by Charles Croome to niece Helen Richards; portrait of Berghem by Eickhart to nephew John Croome; picture of Sea piece by Peters to niece Emily Croome; all other pictures to exors. equally to be divided between them; my Statuettes Vases and Curiosities in my drawing room to nieces equally to be divided between them; my engravings and photographs together with all books of prints to nephews and nieces equally to be divided between them; annuity of about £20–£30 a year, if required to Miss Lane of Glos. schoolmistress, protegee of sister Mary.

Nephews Thomas Robert and James Daubeny appointed joint Exors and residuary legatees.

Dated 1 July 1861 and witnessed by W. Biddle solicitor and Edgar Glanville solicitor's clerk.

Codicil 1.

£1800 to children of Nephew Edward Richards having *dec.* under conditions; £1000 in trust for Helen, widow of said E. Richards; Annuity of £7 to Miss Lane in lieu of original legacy.

Dated 13 Jan. 1864. Witnessed by Chas. Kitson solicitor Torquay, G. M. Tripe his clerk.

Codicil 2.

Nephews Robert Daubeny and James Daubeny each £1000 3 % Consol. Bank Annuities in lieu of their executorships and residuary legacies; Frederick Bulley son of President of Magdalen £100 stock, in lieu of his father; Susannah Mills annuity of £10 in lieu of £100. Th. Daubeny to be sole exor and residuary legatee.

Dated 15 May 1865. Witnessed by Robert S. Hawkins, solicitor Oxford, E. Carter his clerk.

Codicil 3.

£100 to Editor of his MSS. revoked; £100 to Rev. John Filmer Anstey revoked; annuity to Miss Lane revoked; £10 to John Pillinger revoked. Children of late nephew Edward Richards to have £600 3 % Consols additional; John Harris given liberty to exchange microscope for other apparatus or books of equal value.

Dated 23 Nov. 1867. Witnessed as Codicil 2.

Codicil 4.

Bequest of MSS. to exors revoked; bequest of Italian, French and Spanish, and of classical and miscellaneous books revoked; To exor. Thomas Daubeny, Theological books; all books not otherwise disposed of to Robert Daubeny and to nieces, Mrs. Bulley, Mrs. Butler, Mrs. Geo. Richards, Miss Matilda Croome, Mrs. Robert Henry Daubeny, of Rington, Somerset, in equal shares, to be allotted by exor; to President and Scholars of Magdalen College all my Philosophical Apparatus which may be found at my death in the drawing-room of the Botanic House; to Henry Ellis, one of the Gardeners at the Botanic Gardens, a pension of £10 a year, to begin when incapacitated from doing his ordinary work.

Dated 23 Nov. 1867. Witnessed as Codicil 2.

Codicil 5.

Nephew James Daubeny, annuity of £50.

Dated 3 Dec. 1867. Witnessed by Henry Matthews Tuckwell, M.D., 99 Holywell Street; Frederick Symonds, F.R.C.S. England, 35 Beaumont Street, Oxford.

Codicil 6 (abstract).

I revoke the Bequest of bust of Dr. Dalton which is usually standing on the Mantel piece in my dining-room, which is given to the first member of Magdalen College who shall obtain the Newdigate Prize, and I give the said Bust to my friend Dr. Rolleston, but in lieu of such bequest to such member of the said College I beg the acceptance by him of the following books, Pompeiana, by Sir William Gell and John Gandy, 1852, and Milman's Horace.

Dated 9 Dec. 1867. Witnessed by Louisa Barford and Robert Daubeny.

Dec. 13 Dec. 1867.

Proved 18 January 1868.

iii. The Daubeny Club.

Soon after Dr. Daubeny's death a Scientific Club was founded in his honour. The following were the Rules and an early list of the Members :—

RULES OF THE DAUBENY CLUB.

1. The Society shall be called the Daubeny Club, and shall have for its object the discussion of scientific topics of general interest, and also the bringing together of those working at, and interested in, Natural Science.

2. There shall be two or more Honorary Presidents, a Chairman, and a Secretary, as Officers of the Society. The Chairman and Secretary shall be elected, the former terminally, and the latter annually, from among the Members.

3. The number of Members, exclusive of the Officers of the Society, shall be limited to twenty.

4. The first Meeting in each Term shall be held on the second Monday in that Term, and the succeeding Meetings shall be held on each alternate Monday during Term.

5. These Meetings shall be held in each Member's rooms in rotation.

6. If any Member wish to have the Meeting held in the Merton Science Room, instead of his own rooms, he shall be allowed to do so, provided he obtain leave of the College and also entertain the Society there.

7. The Meetings shall commence at 7 o'clock on each evening; at 8 o'clock the Papers for that evening shall be read, and after the discussion of these Papers any Private Business of the Society shall be transacted.

8. Each Member shall be allowed to introduce a stranger to any Meeting of the Society, sufficient notice having been previously given to the Member in whose rooms the Meeting is to be held.

9. The same stranger shall not be admitted more than once in one Term to any of the Society's Meetings.

10. Any Graduate or Undergraduate of this University shall be eligible for election into the Society, and shall be proposed and seconded at any one Meeting and ballotted for at the next, *one* black ball excluding.

11. Any Candidate thus proposed and seconded at any one Meeting shall be allowed to attend at the *next* Meeting as a '*Probationary Member*'; due notice having been sent him by the Secretary.

12. No Candidate can be proposed more than once in one Term.

13. All Strangers and Probationary Members shall withdraw after the conclusion of the discussions of the Papers read before the Society, and before the commencement of any Private Business.

14. The Secretary shall send to each Member a notice, stating where the next Meeting will be held, the Papers to be read, and a list of the Candidates to be ballotted for, at least five days previous to that Meeting.

15. Any Member who intends to be absent from any Meeting is expected to send notice to the Member in whose rooms the Meeting is to be held, before 12 o'clock on the day of the Meeting.

16. Five Members, including one of the Officers, shall constitute a Quorum, and no Business shall be transacted and no Papers read unless five Members be present.

17. Tea and Coffee shall be provided at 7 o'clock by the Member in whose rooms the Meeting is held.

18. The Entrance-fee shall be half-a-crown, and a subscription not exceeding half-a-crown shall be levied each Term to defray the necessary expenses of the Society.

19. The Secretary shall undertake the duties of Treasurer, and shall receive the Subscriptions and account for the same to the Society each Term.

20. No change shall be made in any of the above Rules, except after special notice shall have been given to the Society at a previous Meeting, and then only by a majority in a Meeting composed of two-thirds of the then existing Members.

List of Members, Easter Term, 1870.

Honorary Presidents.

T. H. G. Wyndham, M.A., Fellow of Merton.
E. Chapman, M.A., Merton.

Chairman.

E. J. Sampson, Ch. Ch.

Secretary.

J. P. Earwaker, Merton.

Members.

§*W. Chadwick, B.A., Fellow C.C.C.
*J. P. Earwaker, Merton.
§*W. W. Fisher, Merton.
§*F. J. Hicks, B.A., Magdalen.
*W. J. Lewis, B.A., Fellow of Oriel.
*A. Pearce, B.A., Trinity.
*E. J. Sampson, B.A., Senior Student, Ch. Ch.
G. B. Longstaff, New Coll.
F. W. Fison, Ch. Ch.
C. J. F. Yule, Balliol.
J. C. Freund, Exeter.
S. Lupton, Ch. Ch.
A. S. L. MacDonald, Merton.
Prof. Lawson, M.A., Magdalen.
S. H. West, Ch. Ch.
C. Childs, Merton.
E. Cleminshaw, Merton.
J. E. Judson, Ch. Ch.
W. T. Goolden, Magdalen.

* Original Members. § Late Chairman.

APPENDIX E

Geographical Writers.

Since the compilation in 1916 of a preliminary list of travellers and geographical writers connected with the College, all previous records have been beaten by two notable journeys. The globe has been circled in 1919–22 by H.R.H. the Prince of Wales, who, in the description of his travels in his *Book* (1920) and in his *Eastern Book* (1922), has set a high example in the art of producing a readable book with a minimum of letterpress. And again Madigan's exploits in the Antarctic have been paralleled, during the Long Vacations of 1921–2, by Arctic parties which have achieved notable success in latitudes nearer the Pole than any previous explorers from the College.

The Oxford University Expedition to Spitzbergen was organized in 1921 to carry out Zoological, Botanical, and Geological Research in Spitzbergen, and also to visit and survey a little-known part of the island. It was agreed to divide the expedition into two parts: the first to devote itself to the former objects and to start in June, the second to attempt a Traverse, and to start in July. The first party consisted of F. C. R. Jourdain (Magdalen), Leader, J. S. Huxley (New Coll.), T. G. Longstaff (Ch. Ch.), J. D. Brown (Oriel), A. H. P. Wilkes (Lincoln), S. P. Gordon (Hertford), C. S. Elton (New), J. W. Summerhayes (Lond. Univ.), R. P. Segnit (Balliol), G. Binney (Merton), H. L. Powell, Taxidermist, and R. Pocock Cook. The second party was under the leadership of N. E. Odell, and included A. M. Carr-Saunders (Magdalen), Messrs. Stobart, Frazer, and Walton; and Longstaff and Elton joined them later. An oil-engined sloop of about 100 tons, the *Ternigen*, was chartered to take Jourdain and six others to Bear Island, whence Huxley returned with the boat to Tromsö to pick up stores. A fairly exhaustive survey of the south of the island occupied ten days, and two hitherto unrecorded breeding birds were discovered.

On June 25 the party arrived at Spitzbergen, where Huxley was left in charge of a party of four (J. S. H., C. S. E., J. W. S., and R. P. S.) on Prince Charles Foreland, from June 30 to July 10. Meantime Jourdain's party worked round the north-west corner to Leifde Bay, and explored the islands up to the Monaco Glacier: also north to Moffen Island (580 miles from the North Pole). They then returned along the west coast, picking up Huxley and his party, stayed for some time at the Dutch Mine in Ice Fjord, and left on July 22, reaching England on August 3.

The collections included about 300 skins and about 700 eggs. A series of the skins was purchased by the British Museum, another set went to the Oxford Museum, and a large series to Col. Meinertzhagen. The Carlisle Museum acquired a clutch of Barnacle Goose eggs. A preliminary notice of the ornithological results appeared in the *Ibis* for 1922, and the full account will form a separate volume on the Birds of Spitzbergen, which is nearly ready for the press. The last list of birds by an English author comprised 38 species; Jourdain's list will include 69.

In 1922 a smaller expedition, consisting of Major W. M. Congreve and Jourdain, and B. W. Tucker, of Magdalen, left England early in June, and worked mainly in Ice Fjord, where the avifauna was much more thoroughly investigated, and much valuable information was acquired. The party reached England on August 2 with valuable collections.

Mr. Jourdain's previous expeditions in search of new information concerning the breeding and habits of Birds have caused him to visit the following countries, each visit involving some two to five weeks' hard work :—

Holland, 1900, 1901, 1902, 1904, 1923.
France (Haute Savoie), 1923.
Denmark, 1903.
Norway, 1921, 1922.
Spain, 1905, 1906, 1907, 1915, 1919, 1920.
Corsica, 1908, 1909.
Algeria, 1913–14.
Morocco, 1917, 1920.
Rumania, 1910, 1911.
Switzerland, 1923.
Iceland, 1912.
Spitzbergen, 1921, 1922.
Bear Island, 1921.

To the list of writers on p. 192, add J. G. Gamble on S. Africa.

APPENDIX F

ROLL OF WAR SERVICES

1914–1920.

Roll of Honour

This War more than any earlier war was based on science—the science of wasting and killing . . . and the science of saving and healing.—Walter Raleigh, 1920.

The names in each category are arranged approximately in the order of matriculation.

1894. **MACLACHLAN, A. F. C.** *D.S.O.* Maj., Bt.-Lt.-Col., Acting Lt.-Col., 12th Rifle Brigade (Brig. Gen.) Salonika, France. *Bar to D.S.O.* 1 Jan. 1918. Serbian Order of Karageorge. *D.* France 1915; Salonika 1917. Killed in action near St. Quentin 22 March 1918.

1895. **CARDWELL, H. B.** Lt. R.F.A. (Capt.). Died in hospital at Rouen on 9 Aug. 1918 of wounds received in action.

1897. **JOHNSON, G. M.** Surgeon R.N. H.M.S. *Defence.* Killed in action at battle of Jutland 31 May 1916. See p. 434.

1898. **GIRDLESTONE, M. A.** Capt. 41st Dogras Indian Army. Killed in action at Neuve Chapelle 25 Mar. 1915. See p 246.

1898. **SCOTT, S. G.** M.B. Capt. R.A.M.C. France 1917. Italy 1917–18. Died 6 Jan. 1918 of pneumonia contracted while on active service. See p. 437.

1900. **MARTIN, C. H. G.** Lt. 3rd Monmouthshire Regt. France and Belgium. Killed in action near Ypres 24 April 1915. See p. 195.

1903. **BIRCHALL, E. V. D.** Capt. Oxford and Bucks Lt. Infantry. *D.S.O.* 25 Aug. 1916. Died 10 Aug. 1916 of wounds received in action at Pozières on 23 July.

'He led forward his company with great dash under heavy fire, entered the enemy's trenches, and, though dangerously wounded, refused any assistance till assured that the position won was firmly held. *Gazette.*

Supplmt. to *Upton St. Leonard's Parish Mag.*, Oct. 1916.

1904. **WALLING, E.** Capt., Acting Maj. 7th W. Yorks Regt. attd. T.M.B. France and Belgium. *M.C.* 1 Jan. 1918. Croix de Guerre. *D.* France 1917. Killed in action at Kemmel Hill on 25 April 1918. See p. 436.

'Ernest left my battalion last February to take command of our Trench Mortar Battery, and I was exceedingly sorry to lose him. I am told he fought most gallantly before he was killed, and it is only what one would have expected of him, he was always so cool when things began to get unpleasant. He will be a great loss to the Brigade.'

Letter from Lt.-Col. C. H. Tetley, May 1918.

Major-Gen. Neville Cameron wrote in the same sense.

1905. **PRIEST, C. R.** Pte. 18th R. Fusiliers. Died 22 Jan. 1916 of wounds received in action at Guinchy.

1906. **PARRY-JONES, O. G.** Lt. 3rd Lancs. Fusiliers; Capt. R.A.M.C. (S.R.); with 56th Field Ambulance, 18th Div. France 1915–16. *D.* France 1917. Died on 29 Sept. 1916 of wounds received in action.

See p. 439.

1908. **BALFOUR, I. B.** Lt. 14th R. Scots; attached 1st K. O. Scottish Borderers. Killed in action in Gallipoli 28 June 1918.

'He arrived [in Gallipoli] with a draft of 60 men. On the 28th, the day of the attack, we had been ordered to take a portion of a trench which was in the second line of the enemy's trenches. This had to be done after another regiment had taken the first line. He got his men into this 1st line and was killed getting out of this line to go on to the 2nd.' *Letter* from G. B. Stoney.

1908. **CUDMORE, M. M.** Lt., Acting Capt. R.F.A.; D.T.M.O. 3rd Div. France and Belgium. *M.C.* 14 Jan. 1916. *D.* France 1915. Killed in action at St. Eloi 5 April 1916.

'The successful fire of the XIXth Brigade at the second Battle of Ypres was in no small measure due to his gallantry and skill in keeping the telephone wires and telephonists going.' *Letter* from Capt. G. O. Smyth, R.F.A.

1908. **HARPER, A. G.** 2nd Lt. R.F.A. (Lt. i/c Bde. Trench Mortars 1915–16. India, France, Belgium. Killed in action at Brasserie, Dickebusch, 1 June 1917.

See p. 440.

Prof. Harper had served on the western front for just two years and, save for a few weeks while recovering from an injury, received at Longueval, was in the firing line practically the whole of that time. 'He was killed on the first day of the bombardment which preceded the capture of the Messines Ridge. His battery was in the open and well in front; when they opened fire they were so hotly shelled by the enemy in reply that the guns had to be left for a while. In half an hour they returned and resumed firing, but were again compelled to withdraw. After another short interval they again advanced and recommenced firing, and Harper was at once hit and instantaneously killed.'

'He was a most efficient and fearless officer, and held the esteem and affection of his brother officers as well as the men of the battery.' *Letter* from Major E. Raper.

1909. **WALKER, F. C.** Lt. 1/5th King's (Liverpool Regt.). France and Belgium. Killed in action at Frezenburg near Ypres on 20th Sept. 1917.

'He was killed in the early morning of the 20th within a few yards of myself and sitting alongside the C. of E. Chaplain and another brother officer. The Chaplain and F. C. W. were killed instantaneously; the other officer was by those curious decrees of Fate left unhurt. We had all been chatting, over a rough and hurried breakfast, only ten minutes before, and in his jolly way he said, "I'm sweating on leave" (a curious expression he had picked up from the men, meaning their feelings when they know that their leave

date is nearly due), and answering him, I said, "All right, old man, you are down to go as soon as we are out of this show". Laughing, he went away and in a few minutes he was dead. . . . I buried him with four more of his brother officers in a little grave near the trenches marked by a little white cross, and there he lies a stimulus to us others who are still left to go on, without faltering, until the Great Victory of Right is finally secured. . . .'

Letter from Lt.-Col. J. Shute.

1911. **BENNETT, G.** Capt. Special Lists. *D.* France 1918. Killed in Dublin 21 November 1920. See p. 438.

1913. **HALSEY, F. W.** 2nd Lt. R.G.A. Killed in action near Hulluch in France on 14 Nov. 1913.

1913. **PARNELL, J. A. P.** Lt. 1st Gloucester Regt. France. Killed in action at 'High Wood' in the battle of the Ancre on 8 Sept. 1916.

'His platoon just loved him. He was never happier than when he was worrying the Boche, and I am sure he died as he would have wished to die—leading his platoon most gallantly across the open until he was hit. . . . He was buried at Quarry Cemetery.' *Letter* from Capt. D. Baxter.

1913. **SMITH, L. L. de B.** Lt. 6th Rifle Brigade. France and Belgium 1914. Wounded Ypres May 1915. Killed on duty in Sheppey on 3 Sept. 1916 during an air raid.

'On May 3rd we had a terrific shelling all day, and suffered a great deal, and at midnight carried out a pre-arranged retirement from the dangerous salient we were in. Your son, after getting through all that very hard 8 days, led his platoon back, and on the march back by St. Jean, near Ypres, a shell burst at the head of his men. . . . I lost all my four subalterns and practically all my N.C.O.s and over 100 men.' *Letter* from Capt. G. Railston, 12. 5. 1915.

He was killed on the night of Sept. 2, 1916, returning from Sheerness to the camp at Leysdown.

1914. **HODGSON, F. H.** Capt. R.A.F. *D.* France 1918. Accidentally killed at Elincourt 16 Nov. 1918.

See p. 442.

'I had chosen him out to command "O" Flight, a sort of miniature squadron for which I wanted a specially selected officer and had hoped this would be only a step towards the Squadron Command which I had in view for him.'

Letter of Lieut.-Col. J. A. Chamier,
Commanding 15th Wing R.A.F.

1914. **PARSONS, E. K.** Capt. 9th Rifle Brigade. France 1915–16. Killed in action in the battle of the Ancre on 15 Sept. 1916.

'As my Colonel has been killed, I am writing to tell you of P.'

'For over a year he was Transport Officer [to 9th Batt.], and during all this time he kept his command in a very good state of efficiency. About July he was taken on Head-quarters Staff to learn the work of an Adjutant. He took the greatest trouble in learning his new duties and we felt sure he would become a good Adjutant. He was always cheerful and full of fun, and a great help to us all in many trying times.'

Letter from Major F. L. Gull.

'His Colonel, acting Major, Adjutant, and all Captains were killed or died of wounds.'

1914. **VERNON, H. D.** 2nd Lt. 7th King's (Liverpool Regt.); Lt. Grenadier Guards. France 1915–16. Killed in action on the Somme 15 Sept. 1916.

'It was in the advance on Les Bœuf, forming part of the advance on Martinpuich, Flers, and the country round Combles that he fell. His Company covered itself with glory.' *Letter* from T. G. Rogers, Chaplain.

Obit. in *The Carthusian*, April 1917.

[1915]. **SHRAPNEL, V. G. F.** Capt. 8th E. Surrey Regt. France and Belgium 1917–18. Killed in action 23 Mar. 1918. Exhibitioner elect 1915. A great great grandson of the inventor of the Shrapnel shell.

This list once more recalls the story of the alterations to the front quadrangle of the College, which were perpetrated and excused as a 'War Memorial'. Almost every one of those who have read Natural Science up here who has seen the altered quadrangle and the over-large cross, its unlevel stone pavement and its low wall, has expressed his dislike, and some have used strong terms. Many feel that the majority of the departed would have disapproved also.

But in addition to the spoiling of the quiet beauty of the quadrangle, an act of inexcusable vandalism was the lifting of the gravestone of our benefactor, Dr. Daubeny, from its position in the old grass plot under the west end of the Chapel, and the subsequent cutting it up that it might be more conveniently fitted among the new square paving-stones that were laid as part of the Memorial.

The gravestone cannot be enlarged to its original form, but the best tribute that could now be paid to the memories of those who fought for the College would be to restore the quadrangle to what they on returning would have liked to find, namely as it was when they knew and loved it.

As an inscription for our dead warriors, there are the fine lines which have been cut on the cross that marks the grave of Alan Harper at Dickeybusche:

'Take up our quarrel with the foe,
To you from falling hands we throw
The torch. Be yours to hold it high.
If ye break faith with us who died,
We shall not sleep, though poppies grow
In Flanders fields.'

ROLL OF WAR SERVICES

MEDICAL SERVICE

1873. **Jones, W. W.** Maj. R.A.M.C. (T.F. Res.). *D.* Aug. 1919.

1880. **Heaton, G.** Maj. R.A.M.C. (T.F.), 1st Southern General Hospital.

1882. **Gossage, A. M.** M.D. Maj R.A.M.C. attd. Base Hospital, London. *C.B.E.* (Civil). *D.* Sept. 1917.

1886. **Dodds-Parker, A. P.** Lt.-Col. R.A.M.C. attd. 3rd Southern General Hospital. *D.* 1917.

1887. **Fairbairn, J. S.** M.B. Capt. R.A.M.C. attd. 5th London General Hospital.

1888. **Bremridge, R. H.** Maj. R.A.M.C. Chief Sanitary Officer, Southern Command. *O.B.E.* (Mil.). *D.* Sept. 1917.

1888. **Hichens, P. S.** M.D. Lt.-Col. R.A.M.C., O.C. No. 35 General Hospital, France.

1888. **Mackenzie, H. G. G.** Capt. R.A.M.C. (T.F.). (Lt.-Col.). France, Salonika. *D.S.O.* 3 June 1918. *D.* France 1915, Salonika 1918.

1888. **Mallam, E.** M.D. Maj. R.A.M.C. (T.F.), 3rd Southern General Hospital.

1890. **Buzzard, E. F.** M.D. Col. A.M.S. France 1918.

1890. **Fennell, C. H.** M.D. Capt. R.A.M.C.

1890. **Gray, H. E.** Radiologist 81 General Hospital France 1917–19; Consulting Radiologist, Army of Occupation, Cologne, 1919–20.

1892. **Jex-Blake, A. J.** M.D. Capt., Acting Lt.-Col. R.A.M.C. 54th General Hospital, B.E.F. France 1917–19. *D.* France 1919.

1893. **Balfour-Browne, W. A. F.** Capt. Sanitary Service, R.A.M.C. (T.F. Res.).

1894. **Kaye, H. W.** M.D. Capt. R.A.M.C. (D.C.M.S. Jan. 1918). Belgium and France 1914–16.

1896. **Golla, F. L.** M.B. Capt. R.A.M.C. (T.F.) *O.B.E.* (Mil.). *D.* Aug. 1917.

1896. **Singer, C. J.** M.D. Capt. R.A.M.C. Malta, Salonika.

1897. **Hurst, A. F.** Maj. R.A.M.C. *O.B.E.* (Mil.).

1897. **Whitnall, S. E.** M.D. Capt. R.A.M.C. (T.F.). France.

1897. **Johnson, G. M.** See p. 434.

1898. **Scott, S. G.** See p. 437.

1899. **Sturrock, W. D.** M.D. Lt.-Col. R.A.M.C. (T.F.). Belgium, France, Macedonia, Caucasia. *D.S.O.* 11 Jan. 1919. *D.* Salonika 1917.

1899. **Semon, S. C. G.** M.D. I.M.S. 1914–16. Capt. R.A.M.C. Médaille de l'Assistance Publique.

1900. **Douglas, C. G.** B.Sc. M.D. T/Lieut. R.A.M.C. 10 Oct. 1914; T/Capt. 10 Oct. 1915; T/Lt.-Col. R.A.M.C. 6 March 1918; Physiological Adviser to Directorate of Gas Services, B.E.F., France, July 1918. *M.C.* 1 Jan. 1916. *C.M.G.* 3 June 1919. *D.* France, Jan. 1916, May 1917, May 1918, Aug. 1919.

1903. **Fry, H. J. B.** B.Sc. M.D. Capt. R.A.M.C. attd. No. 2 Stationary Hospital. *D.* France 1917.

1903. **Beevor, C. F.** M.B. Lt. R.A.M.C.

1903. **Dutton, F. B.** Surgeon Lt. R.N. H.M.S. *Commonwealth* Grand Fleet.

1906. **Venables, J. F.** M.B. Capt., Acting Maj. R.A.M.C. Egypt.

1908. **Cavenagh, J. B.** M.B. Capt. H.Q. Douai Cadres, R.A.M.C. (Maj. R.A.M.C., attd. 113th Field Amb.). France, Belgium. Wounded Somme 1916. *M.C.* 17 Sept. 1917; *Bar* 15 Feb. 1919.

1910. **Evans, G. I.** M.B. Capt. R.A.M.C. France and Belgium 1917–19.

1912. **Britten-Jones, E.** Capt. R.A.M.C. (S.R.) India.

1920. **Lendon, G. A.** Surg.-Lt. 2nd Battle Cruiser Squadron, R. Australian Navy.

NAVAL SERVICE

1897. **Johnson, G. M.** See p. 434.

1901. **Stewart, R. H. R.** Paymaster Lt. R.N.R. North Sea and West of Scotland patrols.

1903. **Whitaker, H. S.** Lt. R.N.V.R. Italy.

1903. **Nalder, H. G.** Lt.-Commdr. R.N.V.R.

1903. **Dutton, F. B.** See above.

1906. **Greene, B. S. C.** Lt. R.N.V.R.

1908. **Garton, A. S.** Lt. R.N.V.R. Eastern Mediterranean, Greece, Egypt, France.

1914. **Harvey, R. A.** Midshipman R.N. Sept. 1915–June 1916, Grand Fleet; Lt. R.N.V.R., H.M.S. *Assistance*, Grand Fleet, Nov. 1916–end of war.

1919. **Carver, J. E. A.** Midshipman R.N.V.R. Channel Patrol; Destroyer Flotilla, Grand Fleet.

1919. **de la Warr, H. E. D. B. S., Earl.** Deck-Hand Signalman R.N.R. Irish Channel and North Sea 1918–19.

1918. **Rogers, A. J.** Lt. R.N.V.R.

1920. **Lendon, G. A.** See above.

AIR SERVICE

1904. **Tizard, H. T.** Lt.-Col. Technical Officer R.A.F. *A.F.C.* 2 Nov. 1918. *D.* March 1918.

1906. **Rice, G. V.** Capt. R.F.A.; Maj. R.A.F. *D.* France 1916.

1908. **Angas, R. F.** Lt. R.H.A.; Lt. R.A.F. *D.* France 1917.

1910. **Smyth, G. M.** Capt. 6th Loyal N. Lancs. Regt.; Capt. 31st Wing H.Q. R.A.F. Gallipoli, Suez Canal, Mesopotamia, Persia.

1910. **Sunderland, J.** Pte. 6th Royal Fusiliers; Cadet R.A.F.; Aeroplane Inspector, Aeronautical Inspection Dept.

1911. **Horsfall, E. D.** Maj. R.A.F. (Lt.-Col.). *D.F.C.* 1918. *M.C.* 1916. Croix de Chevalier de Légion d'Honneur. *D.* France 1915.

1913. **Rubie, H. E.** 2nd Lt. Flying Officer R.A.F.

1914. **Hodgson, F. H.** See p. 442.

1919. **Payne, A. F.** Lt. Australian Flying Corps. Egypt 1916; France 1916–17.

1919. **Williams, E. S.** Lt. R.A.F. (Flight Commdr.). France.

1919. **Read, H. S. H.** Lt. R.A.F. France and Belgium. Independent Air Force.

1919. **Wellesley-Wesley, C. M. St.M.** Gent. Cadet R.M.C. Sandhurst. (Discharged unfit 1918.) Enlisted as 3rd Air Mechanic R.A.F. June 1918.

1919. **Nokes, M. C.** 2nd Lt. R.G.A.; Lt. (Observer) R.A.F. France 1916–18. *M.C.* 16 Aug. 1917.

SERVICE IN THE EAST

1891. **Walker, J. A.** Capt. 6th Essex Regt.; Maj. M.G.C. Egypt and Palestine. *D.* Egypt 1917.

1894. **Maclachlan, A. F. C.** See p. 466.

1897. **Strutt, G. A.** Maj. Derbyshire Yeomanry (Lt.-Col.). Egypt

1915; Gallipoli 1915; Salonika 1916; France 1917; Italy 1918. *D.* Gallipoli 1916; France 1919.

1897. **Ryder, C. F.** Lt. Yorks Hussars; Soudan C.S. attd. (with rank of Maj.) Intelligence Dept. Egypt, 1917. Palestine. *O.B.E.* (Mil.) *D.* March 1918; Palestine 1918.

1897. **Stewart, D. M.** Lt. I.A.R.O. attd. 2/154th Indian Infantry. India.

1904. **Glover, H. M.** Tpr. Punjab Light Horse, I.D.F. *D.* India 1919.

1904. **Carr-Saunders, A. M.** Capt. R.A.S.C. France, Egypt, Palestine, Aden.

1905. **Cox, C. E. C.** I.A.R.O.; Lt. 12th Cavalry, Indian Army. Mesopotamia 1915–16.

1905. **Moulton, J. C.** B.Sc. Capt. 1/4th Wilts. Regt.; Capt., temp. Major G.S.O. 2 Straits Settlements Command. India 1915–16; on General's Staff at Fort Canning, Singapore, 1916. *O.B.E.* (Mil.). *D.* India 1919.

1905. **Sparrow, W. G. K.** Capt. Cheshire Yeomanry. Egypt, Palestine, France.

1906. **Ogilvie, A. G.** B.Sc. Capt. R.F.A. France 1915. Maps Officer, Gallipoli 1915 and Salonika 1916–18; G.S.O. 3, War Office 1918, and at Peace Conference, Paris, 1919. *O.B.E.* (Mil.). Serbian Order of the White Eagle. *D.* Salonika 1916.

1907. **Somervell, D. B.** Capt. 1/9th Middlesex Regt. (Staff Capt.). India 1914–17. Mesopotamia 1917–19. *O.B.E.* (Mil.). *D.* Mesopotamia 1918.

1908. **Balfour, I. B.** See p. 467.

1910. **George, H. S.** 2nd Lt. 1st (King George's Own) Sappers and Miners, with Imperial Service Sappers. Mesopotamia Exped. Force. Basra, March 1918.

1910. **Goldsworthy, L. J.** Trooper in Nagpur Mtd. Inf. 1914–17; Indian Army Reserve of Officers attd. 16th Cavalry 1917–18; Palestine Aug. 1918–Mar. 1920.

1912. **Shorthose, D. N.** Lt., Acting Capt. R.F.A. France, Mesopotamia.

1912. **Bird, A. H.** Capt. 1st Lincs. Regt. D.A.A. and Q.M.G. Gallipoli 1915; France 1916, 17.

1912. **St. Audries, A. P., Lord.** Lt. 5th Somerset L.I. (T.F.). India.

1914. **Lewthwaite, R.** Lt. 1/4th Border Regt. India.

1915. **Kent, P. C.** Lt. R.A.S.C. Salonika. Serbian Gold Medal for Zealous Service. *D.* Serbian 3rd Army Dispatches, Dec. 1916.

1918. **Davies, D. S.** Lt. 7th S. Wales Borderers; Lt. R.E. France, Salonika.

1919. **James, W. E. C.** Lt. 2/4th Northumberland Fusiliers; Lt. 10th Bn. M.G.C. Salonika 1917; Palestine 1917–19. *D.* Palestine 1918.

1919. **Drake R. H. M.** 2nd Lt. 1/1st Leicester R.H.A. Palestine.

SERVICE IN THE WEST

1882. **Holt, H. E. S.** Lt.-Col. Hants Carabineers; attd. to R.F.C. as Maj. 1914-19; Officer of Crown of Belgium and Crown of Italy.

1882. **Kent, A. F. S.** D.Sc. 2nd Lt. Unattached List, attd. Bristol University O.T.C.

1886. **Caldwell, W. H. M.** Chaplain of the Forces (4th Class).

1888. **Long, S. C.** Maj. Bt.-Lt.-Col. Rifle Brigade; Director General of Transportation (A.Q.M.G.). *D.* France 1915, 16, 17.

1888. **Blood, J. N.** B.C.L. Maj. R. Defence Corps.

1890. **Lovat, S. J., Lord.** K.T., K.C.V.O., C.B., D.S.O. Col. 1st and 2nd Lovat's Scouts and 4th Gordon Highlanders; A.D.C. to to the King; Temp. Brig.-Gen., Director of Forestry. France. Croix d'Officier de la Légion d'Honneur. Commandeur, Ordre du Mérite Agricole. *D.* Feb. 1917; France, 1917, 18.

1892. **Burnaby-Atkins, J.** Capt. 3rd Staffs. Regt.; Reserve of Officers, empld. War Office. *D.* Mar. 1919.

1893. **Bayley-Worthington, A. B.** Maj. S. Notts. Hussars; Maj. attd. H.Q. 3rd Canadian Divl. Artillery. France 1917–18.

1893. **Blaine, G.** Capt. 3rd attd. 1st Somerset L.I. *M.C.* France 1 Jan. 1917.

1893. **Chapman, E. H.** Capt. T.F. Res. (Maj. D.A.A.G.). *D.* France 1918. Ireland 1920.

1893. **Powell, D.** Maj., Bt.-Lt.-Col. R.W. Fusiliers; Lt.-Col. Staff Officer (1st Class) to Director of Manning R.A.F. *C.B.E.* (Mil.). *D.* Feb. 1917, March 1918.

1894. **Spencer-Churchill, E. G.** Capt. Grenadier Guards. France

1914–18. *M.C.* 16 Oct. 1918. Croix de Guerre. *D.* France 1917. Wounded.

1895. **Page, A.** Lt. R.M.A. (Capt.). Belgium, France.

1895. **Cardwell, H. B.** See p. 466.

1897. **Newbold, W.** Capt., Acting Maj. 13th Batt. R.G.A. France 1915–19. *O.B.E.* (Mil.). *D.* France 1916, 17, 18.

1897. **Simonds, J. H.** Maj. 2/4th R. Berks. Regt. France.

1898. **Girdlestone, M. A.** See p. 466.

1898. **Medlicott, W. S.** Lt. Northumberland Hussars (T.F. Res.), (Capt.).

1899. **de la Rue, I. A.** Lt. 19th R. Fusiliers, empld. War Office. *D.* France 1917.

1899. **Galloway, J. A.** Capt. 20th Manchester Regt.

1899 **Monck, G. S. S.** Lt., Acting Maj. R.E. (T.F.)

1899. **Walker, B. J.** Lt.-Col. 8th R. Sussex Regt. France. *D.S.O.* 3 June 1918. *D.* France 1918–19.

1900. **Martin, C. H. G.** See p. 195.

1900. **Clowes, G. C. K.** Lt.-Col. 1/14th London Regt. (London Scottish) D.A.Q.M.G. 1st Div. 1917–18. *D.S.O.* 1 Jan. 1917. *D.* France 1916 twice.

1900 **Knight, J. G. D.** Lt., Hon. Capt. and Qr.-Master, The Royal. Highlanders of Canada. France, Belgium, Germany.

1901. **Fisher, K.** Lt. Unattached List, (T.F.) Clifton College O.T.C

1901. **Ackers, C. P.** Maj. R.A.S.C. *D.* France 1918 twice.

1901. **Carlisle, K. M.** 2nd Lt. R.F.A.

1901. **Morrell, J. H.** Capt. O.U.O.T.C., attd. No. 4 O.C.B.

1902. **Bethell, Hon. R.** Capt. 3rd Scots Guards (S.R.).

1902. **Flower, C. H.** Capt. 16th London Regt. (Queen's Westminster Rifles) (Maj. 22nd London Regt.). *M.C.* 27 Mar. 1918.

1902. **Stobart, J. D.** Capt. Hants Yeomanry.

1903. **Pratt-Barlow, R. F.** Lt. Coldstream Guards (S.R.) (A.D.C.).

1903. **Birchall, E. V. D.** See p. 467.

1904. **Walling, E.** See pp. 436, 467.

1904. **Garton, C. L.** Capt. Special Lists. *D.* Feb. 1917.

1905. **Fenwick, C. B.** Pte. 5th Northern Cyclist Batt. 4 Aug. 1914; Capt. Dec. 1914; Capt. 1/8th London Regt., B.E.F.; wounded Ypres, 7 June 1917; Legal Adviser 23rd Army Corps H.Q. 1918.

1905. **Priest, C. R.** See p. 467.

1906. **Hammick, D. L.** Capt. Unattached List, (T.F.) Gresham's School O.T.C.

1906. **Parry-Jones, O. G.** See pp. 439, 467.

1906. **Cardwell, R. M.** Capt. Sussex Yeomanry attd. Lincs. Yeomanry. *D.* France 1916.

1907. **Coventry, A. F.** Canadian Contingent.

1907. **Barnes, H. D.** 2nd Lt. R.A.S.C. *D.* 1919.

1907. **Strutt, G. St. J.** Capt. 5th Essex Regt. France.

1907. **Wilkie, A. H.** Capt. K.R.R.C. (Maj.); on Staff G.H.Q., 3rd Echelon 1916. *D.* France 1917; March 1919.

1908. **Harper, A. G.** See pp. 440, 468.

1908. **Cudmore, M. M.** See p. 468.

1908. **Clemes, A. W.** Friends Ambulance Unit, Pte. aft. Lt. 12th Bn. A.I.F. France 1915–18.

1909. **Ritchie, A. T. A.** Caporal 3ième Compagnie Bataillon C, 2ième Régiment. Légion Étrangère, 1914. Lt. Acting Capt. Grenadier Guards. Wounded 28 Sept. 1915. *M.C.* 4 Nov. 1915. Croix de Chevalier de la Légion d'Honneur. *D.* France 1915.

1909. **Acland, L. H. D.** Capt. Special Bde., R.E. *M.C.* 1918.

1909. **Walker, F. C.** See p. 468.

1909. **Symon, O. S.** Lt. Cyclist Corps A.I.F. Egypt, France.

1910. **Paterson, J. C.** Capt. 7th King's (Liverpool Regt.) (T.F.); Lt., Acting Capt. R.F.A. France and Belgium 1915–19. *D.* France 1917.

1911. **Bennett, G.** See p. 438.

1911. **Chapman, E. F.** Lt. 20th R. Fusiliers, attd. 53rd R. Sussex Regt. (Capt.). France 1916–17.

1911. **Gibbons, G. S.** 2nd Lt. 13th R. Fusiliers, attd. H.Q. 3rd Army. France and Belgium.

1911. **Hodgkinson, N. A.** Capt. 3rd attd. 10th R. Warwicks Regt. empld. O.C.B. France.

1912. **Prevett, R. A. C.** Lt E. Yorks. Regt. Belgium and France. Mesopotamia.

1912. **Browne, W. L. F.** Capt. 80th Batt. 5th Div. R.F.A. Belgium, France, Italy.

1912. **Carr, J. L.** Capt. R. Berks. Regt.

1913. **Halsey, F. W.** See p. 469.

1913. **Parnell, J. A. P.** See p. 469.

1913. **Smith, L. L. de B.** See p. 469.

1913. **Berners, G. H.** Lt. 3rd Norfolks. Wounded 12 Mar. 1917.

1913. **Long, W. H. T.** Lt. Acting Capt., Labour Corps, attd. H.Q. Australian Corps. *D.* France 1918.

1913. **Du Trieu de Terdonck, C.** 101e Batterie, Belgian Army 1917.

1913. **Upton, Hon. H. A. G. M. H.** Lt. R.E. Kent Yeomanry.

1914. **Parsons, E. K.** See p. 470.

1914. **Furniss, A. E.** Capt. 5th York and Lancaster Regt. France and Belgium. Wounded in head, April 1919.

1914. **Vernon, H. D.** See p. 470.

1914. **Hopkins, H. O.** Lt. 7th King's (Liverpool Regt.) (T.F.). France.

1914. **Madigan, C. T.** Capt. 76th Field Coy. R.E. France 1915–17. Wounded Oct. 1915 and 20 Dec. 1916. *D.* France 1917.

1914. **Vernon, H. B.** Lt. 1st Grenadier Guards (S.R.). France. *M.C.* 11 Jan. 1919.

1915. **Shrapnel, V. G. F.** See p. 470.

1915. **Fraser, H. D. F.** 2nd Lt. R.F.C. Lt. Grenadier Guards. France.

1915. **Read, W. D. B.** Lt. 1/4th Queen's (R.W. Surrey Regt.).

1915. **Engleheart, F. H. A.** R.A.C. Driver, Northern Army and 23rd Corps, Home Forces, 1917–19.

1915. **Shaw, W. R. C.** Staff driving for W.O. 1917–18.

1915. **Windram, R. W.** 2nd Lt. F.A.; A.E.F. 1917–19.

1916. **Denning, A. T.** 2nd Lt. 151st Field Coy. R.E. France 1918–19.

1917. **de Beer, G. R.** 2nd Lt. 2nd Grenadier Guards. France, Belgium, Italy.

1917. **Boulter, S.** 2nd Lt. 4th Bn. Tank Corps. *M.C.* France 15 Feb. 1919.

1917. **Willis, R. H.** 2nd Lt. R.G.A.

1917. **Porritt, W. H.** With Labour Bn. 1917–19.

1918. **Koerner, E. H.** With Foreign Legion Aug. 1914–Feb. '15. Transf. to 21st Div. B.E.F. 1915–16; attd. Intell. Branch, 1st Corps, B.E.F. 1917–18.

1919. **Wightman, W. A.** Lance-Cpl. Q. Special Coy. R.E. France 1916–19.

1919. **Pallemaerts, F. A. F.** Sous-Lt. de Réserve, Con. I.D.A. Belgian Army. Croix de Guerre.

1919. **Bathurst, Hon. B. L.** 2nd Lt. R.G.A.

1919. **Butler, L. T.** Lt. 12th Bn. A.I.F. Egypt, Belgium, France.

1919. **Berkeley, R. G. W.** Lt. Westminster Dragoons, attd. M.G.C. France, Belgium, Palestine, Germany. Lt. T.A., Reserve General List.

1919. **Crisp, G. H.** 2nd Lt. 23rd London Regt. France 1917–18.

1919. **Gunther, R. J.** Lt. 2nd Life Guards. France. Star of Rumania.

1919. **Hoskyns, H. W. W.** 2nd Lt. R.G.A.

1919. **O'Brien, Hon. P. L.** Cadet 212th Batt. R.F.A.

1919. **Topping, C.** Cadet No. 8 O.C.B.

1919. **Vivian, A. H. S.** 2nd Lt. R.F.A.

1920. **Fleming, J. F.** Lt. 'U' Batt. R H.A. France 1917–18. Germany 1918–19. *D.* France 1918.

ADDITIONS TO APPENDIX G

LIST OF TREATISES BY SCIENTIFIC MEMBERS OF MAGDALEN COLLEGE 1458–1850.

1608. **Forman, Simon.** Astrologer (D.N.B.).

Part of his *Diary* is preserved in the Bodleian MS. Ashmole 2402, from which an account of his Lambeth garden is printed in Gunther, *Early British Botanists*, 1922.

1639. For **Chilmead, Edmund,** read **Chilmead, John.** M.A. of Christ Church.

c. 1650. **Browne, William.** Botanist and Vice-President, buried in the Ante Chapel of the College.

Catalogus Horti Botanici Oxoniensis. [With P. Stephens and the Bobarts.] 16mo, Oxon. 1658.

His Plant Records entered in the Magdalen copy of How's *Phytologia* are printed in Gunther, *Early British Botanists*, p. 300.

1655. **Stonehouse, Walter.** Fellow 1617. Member of T. Johnson's Botanical Excursion to North Wales in 1639.

Catalogus Plantarum Horti mei Darfeldiae.

12mo. MS. with Plan, 1640–52. Printed by Gunther in the *Gardener's Chronicle*, May 1920, and described in *Early British Botanists*, 1922.

Dedicatory Verses to the *Museum Tradescantianum.*

Published in the year after Stonehouse's death. He signed them with his name and anagram

GUALTERUS STONEHOUSUS
Theologus servus natus

The original MS. of these poems is in the Bodleian MS. Ashmole. 1656.

1730. **Saul, Edward.** Demy 1680; Fellow 1698–1704.

An Historical and Philosophical Account of the Barometer or Weather-glass, wherein the reason and use of the Instrument, the Theory of the Atmosphere, the Causes of its different Gravitation are assign'd and explain'd.—And a Modest Attempt

from thence made towards a rational Account and probable Judgement of the Weather. London, 1730.

He notes 'I had formerly the opportunity of learning under Dr. Keil at Oxford'.

The Grasier's Complaint; or the Necessity of Restraining Irish Wool and Yarns & of raising and supporting the Price of Wool of the Growth of Great Britain. *c.* 1730.

Cf. Bloxam, *Register*.

1748. **Knight, Gowin** (p. 203).

His portrait was painted and etched by B. Wilson in 1751.

1762. **Cartwright, Edmund.** Demy. F.R.S. See p. 151.

1796. **Gibbes, George Smith.** Physician Extraordinary to Queen Charlotte, 1819; knighted by the Regent in 1820.

A paper on Animal Matters in the *Philosophical Transactions* for 1794.

Syllabus of a Course of Chemical Lectures. 8vo, Bath, 1799.

A Treatise on the Bath Waters. 8vo, Bath, 1800.

A Second Treatise on the Bath Waters. 8vo, Bath, 1803.

A Phlogistic Theory. Part i. 8vo, Bath, 1809.

Outlines of a new Theory of Medicine. 8vo, Bath, 1815.

Pathological Enquiries. Harveian Oration 1817. 16mo, Bath, 1818.

Also papers in the *Trans. Linn. Soc.* v.
Nicholson's Journal Nat. Phil. ii, iii, xiv, xix.
Tilloch's Phil. Mag. xxxix.

1810. **Daubeny, Charles Giles Bridle** (pp. 53–64, 189, 297, &c.).

1831. **Shirley, Evelyn Philip.**

Some Account of English Deer Parks. 1867.

1854. **Whall, W. B.** Chorister 1854. F.R.A.S. Principal Officer, Board of Trade; Extra Master, Younger Brother Trinity House.

Practical Seamanship (in conjunction with J. Todd). 6th edit. London, 1911.

Handy book of the Tides. 10th edit. London, n.d.

Handy book of the Stars used in Navigation. 4to, London, n.d.

Shakespeare's Sea Terms Explained. Bristol, 1910.

1860. **Gamble, John George,** e.s. of Dr. Harper Gamble, R.N., M.D. Edin. *b.* 22 Jan. 1842. I. Math. Mods. 1861; Jun. Math. Scholarship, 1862; II. Lit. Hum. 1863; I. Math.

1864; Johnson Gold Medallist 1871, for an essay on 'Laws of Wind'; Math. Lecturer at Lincoln and Merton. In 1866 trained as a civil engineer under Sir John Hawkshaw; engaged on Albert Dock, Hull, and on Sewers at Brighton; Secr. to Sect. G. of British Association, 1872; assisted Hawkshaw in surveying Brazilian Harbours, 1874; Hydraulic Engineer to Col. of Cape of G. Hope, 1875. *m.* Miss Constance Brounger 1878. *d.* 7 Nov. 1889 of typhoid fever.

The Brighton Intercepting and Outfall Sewers.
Rep. Brit. Ass. 1872; *Min. Proc. Inst. C. E.* 191–225, 1875–6.

Report on the water supply of Cape Town.
Cape Town, 1875.

Reports of the Hydraulic Engineer (1876–85). Parliamentary Papers. Cape of Good Hope, 1876–85.

Report on the water supply of Port Elizabeth.
Port Elizabeth, 1877.

Rainfall of South Africa.
Trans. S. Afr. Phil. Soc. i, pp. 13–21, 1877–9.

A storage reservoir in the Achterfield.
Trans. S. Afr. Phil. Soc. i, pp. 219–25, 1879.

Some of the problems awaiting scientific research in South Africa. *Trans. S. Afr. Phil. Soc.* ii, pp. 91–9, 1879–81.

Summer and winter temperature in South Africa.
Trans. S. Afr. Phil. Soc. ii, pp. 104–9, 1881.

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Q. Journ. Meteor. Soc. vii, pp. 3–8, 1881.

Note on a comparison of maximum and minimum temperature and rainfall observed on Table Mountain, and at the Royal Observatory, Cape Town, during January and February, 1881. *Q. Journ. Meteor. Soc.* vii, p. 249, 1881.

Proposals of the Table Mountain Water Supply Company.
Trans. S. Afr. Phil. Soc. iii, p. 5, 1881.

The barometer and the winds. Annual presidential address to to South African Philosophical Society.
Trans. iii, pp. xix–xxvi, 1881–5.

The waterworks of Port Elizabeth, South Africa.
Proc. Inst. C. E. lxxxiv, pp. 128–45, 1882–3.

Annual presidential address as president of the South African Philosophical Society, 25 July 1883.
Trans. S. Afr. Phil. Soc. iii, pp. xlvii–lvii, 1881–5.

Meteorological notes.
Trans. S. Afr. Phil. Soc. iv, pp. 10–14, 1884–8.

Catalogue of printed books and papers relating to South Africa. Part II. Climate and Meteorology. Cape Town, 1885.
Altitudes above sea level of places in South Africa south of 20° S. latitude. Cape Town, 1886.
Water supply in the Cape Colony. *Proc. Inst. C. E.* xc, pp. 255–94, 1886–7.
Rainfall on and around Table Mountain, Cape Town, Cape Colony. *Q. Journ. R. Meteor. Soc.* xiv, pp. 12–14, 1888.
Obituary Memoir. ? in *Proc. Inst. C. E.*, 1890.

1854. **Moreton, Hon. B. B.** Succeeded his brother as 4th Earl of Ducie, 1922.

1856. **Norsworthy, G.** † 1920.

1859. **Daubeney, E. T.** † 20 Aug. 1914.

1864. **Reid, R. T.** 1st Baron Loreburn. † Nov. 1923.

1870. **Poole, W. H. W.** Science Master at Charterhouse. † 1890.

The following extract is taken from a letter from Poole to the Science Tutor at Magdalen. It describes a situation which was not uncommon in our experience:

'For some time I have had a set of boys who would not go anywhere but to Cambridge: one with me now could easily get a Scholarship at Oxford, but he won't go there. However I am getting some younger ones with more open minds and hope this year or next to send you up one or two decent fellows.'

Charterhouse, Godalming, March 2, 1888.

1874. **Bell, F. J.** † 1 April 1924.

1876. **Blomfield, J. E.** † 8 July 1921.

1877. [**Shuffrey, William Arthur.**] Hon. Canon of Ripon.

The flowering Plants and Ferns of Littondale. 8vo, 1891.
British Basidiomycetae: a handbook to the larger British Fungi. 8vo, Camb., 1922.

1880. **Buckmaster, G. A.** Professor of Physiology, Bristol. See pp. 489–91.

1880. **Ellis, R. K.** Killed in a motor accident, Nov. 1915.

1880. **Lascelles, B. P.**, 'the Magdalen Giant.' † 13 Jan. 1922.

Memoir by Sir A. Hort. 1924.

1880. [**Rea, Carleton.**] Editor of the *Mycological Journal.* 1897–.

The Botany of Worcestershire. 8vo, 1909.
New or rare British Fungi. *Trans. Brit. Myc. Soc.* 1916–20.
Lists of Fungi in Worcestershire, Gloucestershire, Herefordshire. See the respective *Victoria County Histories.*
British Basidiomycetes. 8vo, Camb. 1922.

1881. **Roth, W. E.** Magistrate and Medical Officer, Pomeroon River, British Guiana.

Prior, G. T.

(Analysis of) Chabazite and associated minerals from County Antrim. *Min. Mag.* xvii, p. 274, 1916.

The Meteoric Stones of Launton, Warbreccan, Cronstad, Daniel's Kuil, Khairpur, and Soko-Banja. *Min. Mag.* xviii, p. 1, 1916.

On the genetic relationship and classification of Meteorites. *Min. Mag.* xviii, p. 26, 1916.

On the mesosiderite-grahamite group of Meteorites: with analyses of Vaca Muerta, Hainholz, Simondium, and Powder Mill Creek. *Min. Mag.* xviii, p. 151, 1918.

On the chemical composition of the Meteorites Amana (=Homestead) and Eagle Station. *Min. Mag.* xviii, p. 173, 1918.

A method for the quick determination of the approximate amount and composition of the nickeliferous iron in Meteorites; and its application to seventeen meteoric stones. *Min. Mag.* xviii, p. 349, 1919.

(Analysis of) Semseyite from Dumfriesshire. *Min. Mag.* xviii, p. 354, 1919.

(Analysis of) A lead-grey, fibrous mineral from the Binn valley, Switzerland. *Min. Mag.* xviii, p. 360, 1919.

Review of Progress of Mineralogy from 1864 to 1918. *Geol. Mag.* (N. S.) vi, p. 10, 1919.

The classification of meteorites. *Min. Mag.* xix, p. 51, 1920.

(Analysis of) The meteoric stone seen to fall near Crumlin, co. Antrim, on September 13, 1902. *Min. Mag.* xix, p. 149, 1921.

On the South African meteorites Mount Ayliff and Simondium, and the chemical composition of the meteorites Adare and Ensisheim. *Min. Mag.* xix, p. 163, 1921.

A Guide to the Mineral Gallery, British Museum (Natural History). 8vo, London, 1921.

Biographical Notice of Sir Lazarus Fletcher (1854–1921). *Geol. Mag.*, vol. 58, p. 141, 1921.

The meteoric stone which fell at Ashdon, Essex, March 9, 1923. *Min. Mag.* xx, p. 131, 1923.

The meteoric iron of Karee Kloof, and the meteoric stones of Leeuwfontein and Sinai Peninsula. *Min. Mag.* xx, p. 134, 1923.

Catalogue of Meteorites, with special reference to those

represented in the collection of the British Museum (Natural History). 8vo, London, 1923.

Johnson, J. T. Science Master, St. George's School, Harpenden.

1882. **Savage, Canon E. S.** Vicar of St. Nicholas, Warwick, 1923.

Gossage, A. M. (p. 220). Houndesfield, Chalfont St. Giles, Bucks.

1883. **Kent, A. F. S.** Director of the Department of Industrial Administration, Manchester Municipal College of Technology.

White Paper (1915) and Blue Book 1916 on Industrial Fatigue.

Editor of the English edition of Prof. Amar's Physiology of Industrial Organization, 1918.

Farmer, J. B. (p. 222). Member of Advisory Council to Committee of the Privy Council for Scientific and Industrial Research. Hon. LL.D. Edinb. 1923.

Abrahall, J. L. H. † 12 Oct. 1891. He was working in Professor von Baeyer's laboratory at Munich in the summer of 1888, in conjunction with Dr. Bamberger on the 'alicyclic' 1 : 5-tetrahydrodiamidonaphthalene, when he wrote the letter from which the following is extracted:

'I have at last been compelled to give up the research on which I was engaged [owing to repeated attacks of eczema]. The eczema began about a fortnight before the end of the semester, and gradually got worse, but I only left off working a couple of days before the Easter vacation, when I got rid of it in a few weeks. On my returning to the laboratory it began again, and after a fortnight's work became unendurable. This time it was worse than before, but after three weeks of compresses and arsenic I thought I would make one more attempt to go on with my work. However in spite of all precautions it began again as soon as I was exposed to the vapour of the base on which I was working, so I had no alternative but to change my research. Professor Baeyer suggested that I should do inorganic work till the end of this semester, and then begin another organic research, but as I do not wish to do nothing but organic chemistry, I have accepted Prof. Groth's proposal that I should go and work in his laboratory. He has given me for an Arbeit the analysis of Apatite, with the object of improving

on A. Voelcker's work. It will take me, I suppose till Christmas, and after that I think of going to Fougué's laboratory at Paris till the autumn, when I should return to England.

The heat here now is as bad as the cold was in the winter, the thermometer being generally above 80°, and if it weren't for the thunderstorms every two or three days life wouldn't be worth living. However foreigners are beginning to come here already to see the art exhibition and I suppose the place will be crowded a little later. Groth's laboratory is a more comfortable place to work in than Baeyer's, as there are only two or three men working in it, and it is in the Akademie Gebaüde, formerly an Augustine monastery. The monks certainly understood the art of building to suit the climate, which is more than the modern Munich architects do. The semester goes on till the end of July, when everyone flees to the mountains. I went there for a few days at Whitsuntide, and greatly enjoyed it, though there was more snow than was pleasant for climbing. Do you think it would be worth my while to take a Ph.D. degree? I suppose it is the sort of thing that imposes on the uninitiated; but as it represents next to nothing in the way of qualifications, would it count for anything if I were trying to get work as a demonstrator, or in a school? I believe manufacturers are fond of them, but I don't intend to go in for that sort of work. As it costs about £10 to take the degree, I do not wish to do so if it is of no use.'

I have also before me a testimonial signed by Prof. Baeyer.

'Herr Stud. Abrahall hat in dem chemischen Laboratorium der Universitat seit dem Beginn des Semesters mit ausgezeichnetem Fleise gearbeitet.

München den 23ten December 1887.

Professor von Baeyer.

And a second dated '13ten März 1888'.

1884. **Hawkins, C. C.** (p. 225). Superintendent, Department of Technology, City and Guilds of London Institute.

The Theory of Commutators. 8vo, Lond., n.d.

The Dynamo. Sixth edit. in 3 vols. 8vo, Lond. 1924.

Highton, H. P. † 1923.

Jourdain, F. C. R. (p. 225). President of the Ashmolean Society, 1920; Member of the English Committee of the International Ornithological Congress, 1920; Leader of Oxford University Spitzbergen Expeditions, 1921 and 1922. (See p. 464.) Member of Committee for B.O.U. List of

British Birds, 1923. Engaged in reorganization and re-cataloguing the National Collection of Birds' Eggs in the British Museum, 1923–4.

The Birds of Buckingham and the Tring Reservoirs, 1920.
A Geographical Bibliography of British Ornithology, 1919–20.
A Practical Handbook of British Birds. With H. F. Witherby and others. 2 vols., 8vo, 1920–4.
The hitherto known Birds of Marocco, with Bibliography. With Dr. Hartert. Novitates Zoologicae, 1923.
Ornithological Report for Oxon., Berks., and Bucks. With B. W. Tucker. 1915–22.
Papers in the *Ibis*, *Auk*, *British Birds*, *Revue Franç. d'Ornithologie*, &c. 1924.

Giles, R. S. Vice-Chancellor of the University of Rangoon.

1885. **Holt, H. E. S.** C.B.E.

1886. **Gardner, J. A.** Research at Heidelberg with Lothar Meyer, 1890. Reader in Biochemistry, University of London. Lecturer in Org. Chemistry, London School of Medicine for Women. Chemist to St. George's Hospital. Hon. Treasurer Biochemical Society.

War Work: In 1915 he investigated the toxic and physiological effects of chloropicrin, or nitro-chloroform, and recommended it to the authorities for use as poison gas in shells. His brother, T. E. Gardner, Mr. H. Ellison, and himself, put up at their own expense an experimental plant at Buttershaw, and worked out the technical details for the manufacture of chloropicrin in bulk. As a result they manufactured this substance in large quantity—40–100 tons per week—at Wakefield during 1916, 17, and 18, forming themselves into a company for the purpose under the name 'West Riding Chemical Co.' During part of this period they also filled the stuff into shells, and put up a special plant for the purpose. The engineering of these works was considered a model for such works, and it may be mentioned that no single person was killed or injured during the whole time. They also made other poisons at Mirfield. In addition to this he carried out for the Royal Society Food (War) Committee investigations on the digestibility of bread from various kinds of flour, and with a view of testing their laboratory results carried out large scale experiments on their employees at Wakefield. The results are

embodied in a report by the Food (War) Committee of the Royal Society on the Digestibility of Breads.

Ueber Verbindungen tertiaerer Amine mit Essigsauere und deren Homologen. *Berichte d. deut. chem. Ges.* xxiii. 9.

Zur tetramethyl Bernsteinsauere. With K. Awers. *Ber. d. deut. chem. Ges.* xxiii, 18.

On Vapour Density of Ammonium Chloride. With F. Pullinger. *Proc. Chem. Soc.* 1891.

On Turpentine. With J. E. Marsh. *Trans. Chem. Soc.* 1891.

On Camphene. With J. E. Marsh. *Trans. Chem. Soc.* 1891.

On Phosphorus Derivatives of Camphene. With J. E. Marsh. *Trans. Chem. Soc.* 1894.

Products of Oxidation of Camphene; Camphoic Acid and its Derivatives. With J. E. Marsh. *Trans. Chem. Soc.* 1896.

Halogen Derivatives of Camphor and their Re-actions. With J. E. Marsh. *Trans. Chem. Soc.* 1897.

On the Oxidation of Fenchene. With G. B. Cockburn. *Trans. Chem. Soc.* 1898.

On the Oxidation of Fenchone. With G. B. Cockburn. *Trans. Chem. Soc.* 1898.

On the Halogen Derivatives of Fenchene and their Re-actions. With G. B. Cockburn. *Trans. Chem. Soc.* 1898.

New Processes in the Manufacture of Cereal Foods. *Fielden's Engineering Magazine*, 1901.

On the Constituents of the Lacknanthes Plant, Preliminary Notes. *Lancet*, 1902.

On the Bromo-derivatives of Camphopyric Acid. *Trans. Chem. Soc.* 1906.

On the action of Hydrogen Peroxide on Haemin. With G. A. Buckmaster. *Proc. Physiol. Soc.* 1907.

The Anaesthetic and Lethal Quantity of Chloroform in the Blood of Animals. With G. A. Buckmaster. *Proc. Royal Soc.* B. 78, 1906.

The Estimation of Chloroform in the Blood of Anaesthetized Animals. With G. A. Buckmaster. *Proc. Royal Soc.* B. 79, 1907, 309.

The Function of the Red Corpuscles in Chloroform Anaesthesia. With G. A. Buckmaster. *Proc. Royal Soc.* B. 1907.

The Percentage of Cholesterol in Ox-bile. With G. D. Knox. *Proc. Physiol. Soc.* 1907.

The Rate of Assumption of Chloroform by the blood during Anaesthesia. With G. A. Buckmaster. *Proc. Royal Soc.* B. 79, 1907.

The Rate of Elimination of Chloroform from the Blood during Anaesthesia. With G. A. Buckmaster.
Proc. Royal Soc. B. 79, 1907.

The Origin and Destiny of Cholesterol in the Animal Organism. Part I.—On Hippocoprosterol. With Chas. Dorée.
Proc. Royal Soc. B. 80, 1908.

The Origin and Destiny of Cholesterol in the Animal Organism. Part II.—The Excretion of Cholesterol by the Dog. With Dorée. *Proc. Royal Soc.* B. 80, 1908.

Recent Advances in our knowledge of the Constitution of Cholesterol. With C. Dorée. *Science Progress*, 1908.

On Cholestenone. With C. Dorée. *Trans. Chem. Soc.* 1908.

On Coprosterol. With C. Dorée. *Trans. Chem. Soc.* 1908.

Cholesterols. In the New Edition of Allen's *Commercial Analysis*.

Ditto in Blood. With G. A. Buckmaster.

Presence of Cholesterol in heart muscle. With Ellis.
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Proc. Royal Soc. B. 81, 1909.

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Proc. Royal Soc. B 81, 1909.

Origin and Destiny of Cholesterol in the Animal Organism. Part V.—On the inhibitory action of sera of Rabbits fed on diets containing varying amounts of Cholesterol on the Haemolysis of Blood by Saponin. With Mary T. Fraser.
Proc. Royal Soc. B. 81, 1909.

Report on Chloroform Anaesthesia, British Association Committee. With Waller and Buckmaster.

On the supposed presence of Carbon Monoxide in normal blood and in Blood of Animals anaesthetized by Chloroform. With G. A. Buckmaster. *Proc. Royal Soc.* B. 81, 1909.

Origin and Destiny of Cholesterol in the Animal Organism. Part VI.—The excretion of Cholesterol by Cat. With Ellis.
Proc. Royal Soc. B. 81, 1909.

Origin and Destiny of Cholesterol in the Animal Organism. Part VII.—Cholesterol in Blood of Rabbits. With M. T. Fraser. *Proc. Royal Soc.* B. 82, 1910.

New form of Blood-gas Pump. With Buckmaster.
Journ. Physiol. xl. 373, 1910.

Anaesthetic Committee: 2nd Report to British Association. With Waller, Hewitt, Buckmaster.

Gases of arterial and venous blood. With Buckmaster. *Journ. Physiol.* xli. 261, 1910.

Gases of Blood in Chloroform Anaesthesia. With Buckmaster. *Journ. Physiol.* xli. 246, 1910.

Physiological action of some Camphoric Phosphorates of Soda. With W. Legge Symes. *Biochem. Journ.* v. 390, 1911.

Ventilation of Lung during Chloroform Anaesthesia. With Buckmaster. *Proc. Royal Soc.* B. 84, 1911.

Origin and Destiny of Cholesterol in the Animal Organism. Part VIII —On the content of Liver of Rabbits under various diets and during inanition. With Ellis. *Proc. Royal Soc.* B. 84, 1912.

Origin and Destiny of Cholesterol in the Animal Organism. Part IX.—On the Cholesterol content of the tissues other than Liver of Rabbits under various diets and during inanition. With Ellis. *Proc. Royal Soc.* B. 85, 1912.

Nitrogen content of Blood. With Buckmaster. *Journ. Physiol.* xliii, 29, 1912.

Composition of Blood Gases during Respiration of Oxygen. With Buckmaster. *Proc. Royal Soc.* B. 85, 56, 1912.

The Origin and Destiny of Cholesterol in the Animal Organism. Part X.—On the excretion of Cholesterol by man on various Diets. With Ellis. *Proc. Royal Soc.* B. 86, 13, 1912.

The Oxidation of Coprosterol and Coprostanone. With Godden. *Biochem. Journ.* vii, 588.

The Origin and Destiny of Cholesterol in the Animal Organism. Part XI.—Cholesterol content of growing chicks. With Lander. *Proc. Royal Soc.* B. 87, 229.

Cholesterol content of tissues of Cats under various diets and during inanition. *Biochem. Journ.* vii, 576–587, 1913.

Respiratory Exchange in Freshwater Fish. Part I.—On Brown Trout. With Leetham. *Biochem. Journ.* viii, 379–390.

Respiratory exchange in Freshwater Fish. Part II. On Brown Trout. With Leetham. *Biochem. Journ.* viii, 591.

Toxicity of Sodium Pyrophosphate. With Symes. *Biochem. Journ.* ix, 9–16, 1915.

β-Cholestanol and some derivatives as oxidation products. With Ellis. *Biochem. Journ.* xii, 72–80, 1918.

On the digestibility of Cocoa Butter. Part I. With Fox. *Biochem. Journ.* xiii. 368, 1919.

On Chloropicrin. Part I. With Fox. *Journ. Chem. Soc.* cxv. 1188.

On the composition of the unsaponifiable matter of the Ether content of human faeces. *Biochem. Journ.* xv. 244, 1921.

On a source of error in the Colorimetric Methods of estimating Cholesterol in tissue foils. With Fox.
Biochem. Journ. xv. 376, 1921.

Critical study of the methods of estimating Cholesterol and allied substances. With May Williams.
Biochem. Journ. xv. 363, 1921.

Origin and Destiny of Cholesterol in the Animal Organism. Part XII.—On the excretion of Sterol in man. With Fox.
Proc. Royal Soc. B. 92, 358, 1921.

Origin and Destiny of Cholesterol in the Animal Organism. Part XIII.—On the autolysis of liver and spleen. With Fox. *Proc. Royal Soc.* B. 93, 486, 1922.

Respiratory Exchange in Freshwater Fish. Part III.—In Gold-fish. With King and Powers.
Biochem. Journ. xvi. 523, 1922.

Respiratory Exchange in Freshwater Fish. Part IV.—Further comparisons of Gold-fish and Trout. With G. King. *Biochem. Journ.* xvi. 730, 1922.

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The Sterol content of Cows' Milk. With G. Fox.
Biochem. Journl. xvii. 94, 1923.

The Cholesterol content of Human Milk. With G. Fox.
Biochem. Journ. xviii. 9, 1924.

The Sterol balance in Breast-fed Infants. With G. Fox.
(In press.)

Improvements in and relating to the preparation of Quinoline and Quinoline compounds. With M. Williams.
British Patent 198,462.

1886. **Lindley, Hon. L. H.** B.A. 1890; M.B., B.Ch. 1898. Chief Physician to H.I.M. the Shah of Persia. Orders: Lion and Sun in brilliants (1st Class); Chevalier Légion d'Honneur; Commander of the Crowns of Germany, Austria, Italy, and Belgium. Member of Persian Appeal Tribunal, 1924.

1886. **Bennett, R. A. R.**

Practical Photography with Stand and Hand Cameras.
sm. 8vo, Lond. and Dereham, n.d.

1887. **Merry, Dr. W. J. C.** Father of W. J. W. M. (p. 520). † April 1922.

1888. **Fairbairn, J. S.** Obs. Physician, St. Thomas' Hospital.

Pelvic Cellulitis, in Eden's *New System of Gynaecology*, pp. 649–70.

1888. **Bremridge, R. H.** O.B.E. Secretary and Registrar British Pharmaceutical Society. Head-quarters, Northern Region, Ministry of Pensions, 14 Clayton St. West, Newcastle-on-Tyne.

Paget, Sir R. A. S. (p. 229). Hon. A.R.I.B.A. Assistant Secretary Admiralty Board of Invention and Research, 1915–18; District Commissioner of Boy Scouts for Mid-Somerset. Gave a lecture and demonstration of his Voice Production Models in the Daubeny Laboratory on 4 May 1923.

Partnership in Agriculture.

Vowel Resonances. *Proc. Royal Soc.* cii, 1923.

The Nature and Reproduction of Vocal Sounds. *Trans. O. U. Jun. Sci. Club*, Oct. 1923.

Demonstration of Reproductions of Vowel Sounds. *Proc. Phys. Soc.* 1923.

Fused Silica. *Nature*, May 24, 1924.

1889. **Gunther, R. T.** (p. 230). F.Z.S. Retired from Tutorship in Natural Science Dec. 1920; Librarian 1920–3; Research Fellow 1920–; Associate British School at Rome; Associate of Soc. for Promotion of Nature Reserves.

The Date of the Foundation of the Oxford Physic Garden. *Gardener's Chronicle*, 1915.

The Daubeny Laboratory Register. 8vo, Oxford, 1916.

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Creepers at Oxford. „ 30 Nov. 1921.
Ethics of Ivy. *Country Life*, 26 Nov. 1921.

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„ „ Parts III and IV. Physics and Surveying. 8vo, Oxford, 1923.
„ „ Vol. II. Astronomy.
8vo, Oxford, 1923.

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The Old Ashmolean Museum. *Times*, 28 Nov. 1922.
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The Evans Collection „ 28 Dec. 1922.
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Sir Christopher Wren's Science Museum.
Nature, 3 March 1923.
The Building Accounts of the Ashmolean Museum.
Notes and Queries, 10 March 1923.

Articles on the Papers of Edward Gibbon.
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Some unedited Accounts of Edward Gibbon.
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1889. **Hichens, P. S.** (p. 231).

A case of Vegetable Gastrolith. [With N. B. Odgers.]
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Brit. J. Children Disease, Sept. 1913.

Mallam, E.

Notes on two unusual cases. *Brit. J. Dermat. and Syph.* 1922.

Clouston, J. S. (p. 231). Novelist.

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The lunatic *still* at large.	„ 1923.

Mackenzie, H. G. G. D.S.O. M.D. Durham 1913. Asst. Tuberc. Officer, Charing Cross Hospital.

Medical Aspects of Mental Healing.

Medicine and the Church. 1910.

Practical hints on the Pastoral Visitation of the Sick. 1911.

Medical Control in a Boys' Club. 1914.

Health and the Mind. [With G. Rhodes.] 1921.

1890. **Fennell, C. H.** (Char. Cross) 27 Cadogan Court, S.W. 3.

Foster, J. K. Director of Great Eastern Railway Co.

1891. **Buzzard, E. F.** (p. 232).

Acute Poliomyelitis and Allied Conditions. *Lancet*, April 1912.

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Practitioner, vol. xci, 1913.
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Lancet, December 1918.
Lethargic Encephalitis; its Sequelae and Morbid Anatomy. [With J. G. Greenfield.] *Brain*, vol. xlii, 1919.
Case of Spastic Quadriplegia.
P. R. S. Medicine, vol. xiii, January 1919.
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Some Aspects of Mental Hygiene. *Lancet*, December 1920.
Reflex Movements and Postural Reactions in Quadriplegia and Hemiplegia, with Especial Reference to Those of the Upper Limb. [With G. Riddoch.] *Brain*, vol. xliv, 1921.
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Pathology of the Nervous System. [With J. G. Greenfield.] 1921.
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Lancet, 1922.
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Eccles, O. 76 Reigate Hill, Reigate, Surrey.
The Contraction Ring. *B. M. J.*, 1920.
Myotics and Mydriatics. *Medical World*, 1916.

Gilbertson, F. W. J.P. *m.* 1896 Isabel, da. of Iltid Thomas. President of University College, Swansea. Director of Great Western Railway.

1892. **Hill, E. G.** Prof. of Nat. Science, Muir College, Allahabad. † 1917. The following extract from one of his letters describes his life in India:

'I have been in India now for nearly three years, so let me tell you a little of my surroundings and circumstances.

You remember that I came out to a government appointment, the Professorship of Chemistry at the Muir College in Allahabad. In many ways I was disappointed in the College at first. The laboratory was bad and the Chemistry had been

allowed to rust for some time, so that I had rather an uphill fight at first. My friend and colleague Murray, a Cambridge and Aberdeen man, the Professor of Physics, however was most helpful to me, and we have managed between us to get things into shape, and are in hopes of a brand new laboratory to our own specification before long. I have already had the present laboratory much enlarged, and my last effort has been to put up a gas manufacturing apparatus to supply us with our own gas. It is to begin next session. The process is Mansfield's patent, and the gas is manufactured from refuse oil and fats.

I have three examinations to prepare for the Intermediate, which has two classes (about 60 boys of age 17–18). The B.A., two classes of about 40, and the M.A. some 4 or 5 men every year. There are also B.Sc. and D.Sc. examinations: the B.Sc. is much the same as the B.A., except that the optional subjects differ a little and it is of the standard of the Victoria B.Sc. The M.A. is rather harder than a good honours B.A. at Oxford; and the D.Sc. is decidedly difficult. It has just been introduced into the University by Murray and myself. . . . Our Muir College men have always come out well in the University examinations. Last year 3 of my men got 1st classes with special honours in Chemistry in B.A., and our average is much the highest in the University. . . . I have been appointed a Fellow of the University and am a member of the Senate and of the Board of Studies in Science: so on the whole I have prospered and am well content with my lot.

We have a three months' vacation from April 25 to July 19th. This year my wife and I (I married some 18 months ago) have been camping through Kashmir. We travel with tents and servants innumerable (for the last few weeks we have had about 25 coolies and body servants) and have had a most delightful time. The scenery is delightful and the air is sharp and bracing on these hills. Our present camp is 9000 feet above the sea. Last week we crossed a snow pass 14000 feet. Alas, the vacation is coming to its close, and we return to Allahabad and a saturated atmosphere and rains and a temperature never less than 80° and often 95° in the house. In October the sun will be losing its power and then November to the end of February is simply charming. March gets warm and in April the real hot winds have begun to blow and we are thankful to escape to the cooler regions of the Himalayas. . . . I never hear from Ottley. My wife saw him in England and says that he has married. I have written to him two or three times in vain.

This country reminds me much of my holiday in Switzerland with him.... I often recall dear old Magdalen and the coolness of its cloisters, while I bake or boil in our Indian summer....'

Camp Zewing, Kashmir,
28 July 1898.

Simpson, H. C. Fellow of Trinity College, Toronto.

1893. **Balfour-Browne, W. A. F.** (p. 234). M.A. Oxon. et Cantab.; F.R.S.E.; Naturalist in charge of Larne Laboratory of the Ulster Fisheries and Biological Association, 1907–; Lecturer in Zoology (Entomology), Cambridge; Lectured to School Teachers for Council of Zoological Society and under scheme of L.C.C. Education Committee, 1919–20.

Motella fusca: a new British Record.
J. Marine Biological Assoc. vi, 1903.

On *Deronectes depressus* Fab. 8vo, Lond. 1919.
Keys to the Orders of Insects. 8vo, Cambridge, 1920.
Life History of the Water Beetles. 8vo, London, 1922.

Chapman, E. H. County Court Judge, 1923.

Jex-Blake, A. J. (p. 235). *m.* 1920 Lady Muriel Herbert. Living at Nairobi, Kenya Colony.

Sherwood, E. C. (p. 236). Head Master of Ipswich School, 1919.

Scott, S. G. (p. 236). † of pneumonia on active service 1918, see p. 437. *m.* 1903 Marjory Wright.

Preliminary note on the Nature of Gram-staining.
Coll. papers of Dept. of Pathology of Oxford.

Jones, G. A. (p. 237). *Delete* the last note after *m.* 1903.

1894.

Armitage, F. P. (p. 238). *m.* 1907 Louise, da. of J. S. Wilson. Director of Education at Leicester 1919–. Portrait publ. in the *Leicester Advertiser*, Feb. 23, 1924.

Chemistry: First Stage 1916. Second Stage 1917.

Blaine, G.

Notes on the Zebras and some Antelopes of Angola. *P. Z. S.* 1922.

Tinne, P. F. *m.* 1910 Emily, da. of Rev. W. McCulloch. St. George's Hospital. Oak Cottage, Grassendale, Liverpool.

Cookson, Bryan.

Floating Zenith Telescope. *Monthly Notices R. A. S.* lxi. p. 315, 1901.

1895.

Spencer-Churchill, Edward George. M.C., D.L. and J.P. (Worc.) (see p. 476).

Experimented with a Röntgen apparatus, *c.* 1897, with which X-ray photographs of the skeleton of a Frog, &c., were taken for the first time in Oxford. The Wimshurst Machine and Röntgen Tubes used in these experiments were taken by Capt. Churchill out to the South African War, when further invaluable service was rendered at one of the military hospitals, his being the only X-ray plant then available at the front (1899).

Tarpon fishing in Mexico and Florida. n.d. *c.* 1905–6.

Home Industry. A chapter in *The New Order.* 1908.

Catalogue of the Collection of Pictures at Northwich Park. 8vo, 1921.

Hilton, O. s. of D. Hildesheim. Medical Practitioner, The Corner House, Northwood, Middlesex.

Sartoris, A. H. *m.* 1913 Clara E., da. of Rev. T. L. Bridges.

Spilsbury, B. H. Knighted 1923. Lecturer in Morbid Anatomy and Histology, St. Bartholomew's Hospital Medical School. Honorary Pathologist to Home Office. Secretary to Medico-legal Society. 31 Marlborough Hill, St. John's Wood, N.W.

Sudden Death. *Practitioner*, 1917.

Toxic Jaundice in Munition Workers. *Proc. R. Soc. Medicine*, 1917.

Criminal Abortion. *Trans. Med.-Leg. Soc.*, 1918–19.

Medical Investigation of Crimes of Violence. *Trans. Med.-Leg. Soc.*, 1919–20.

Wilson, D. R. (p. 239). Secretary to Industrial Fatigue Research Board.

On Ferro-silicon. *Ann. Rep. of Chief Inspector of Factories*, 1907.

Use of Power Gas in Factories. do. 1911.

Illumination in Factories. do. 1911.

Artificial Lighting of Iron Foundries. do. 1912.

Carbon Dioxide found in Weaving Sheds during Use of Gas. *Second Rep. of Dep. Committee on Humidity in Cotton Weaving Sheds*, 1911.

On some recent contributions to the study of Industrial Fatigue. *J. R. Statistical Soc.*, July 1923.

1896.

Cardwell, H. B. Died of wounds 1918 (see p. 466).

Golla, F. L. See pp. 239. 472. Lecturer. Pathology and Physiology, St. George's. Director Maudsley Laboratory. Late Croonian Lecturer R.C.P. The Dene, Sunninghill, Berks.

Turnbull, H. M. Prof. of Morbid Anatomy, University of London.

Alteration in Arterial Structures and their relation to Syphilis. *Q. J. Med.*, 1915.

Accuracy of Wassermann Tests estimated by Necropsies. *Med. Research Committee*, 1920.

1897.

Kaye, H. W. † 21 April 1922. Subscriptions to Education Fund, for his six children, reported to a meeting held on 8 Oct. 1923, amounted to £1,404 8*s*. with promises of £583 in the next four years. (Co-trustee R. F. Fuller.) In his memory and in that of J. R. Moreton-Macdonald, the east end of Bishop Waynflete's Chantry in Winchester Cathedral was refurnished in 1923.

Singer, Charles, M.A., M.D., D.Litt., Oxford; F.R.C.P. London; F.S.A.; Fellow of the Royal Society of Medicine (Vice-President and Editorial Representative of Historical Section); Fellow of the Royal Microscopical Society; Lecturer in History of Biological Science, Oxford; Lecturer in the History of Medicine at London University (University College and University College Hospital Medical School); President Historical Section Royal Society of Medicine, 1921–2; President 3rd International Congress of the History of Medicine, London, 1922; Editor of *Journal of the R. Microscopical Society*; co-editor of *Isis*; associate editor *Annals of Medical History*; Fitzpatrick Lecturer, Royal College of Physicians, 1923 and 1924.

An apparatus for obtaining graphic records of Blood Pressure. 1910.

A transplantable sarcoma arising in the Uterus of a Rat. 1914.

Notes on the Early History of Microscopes. 1914.

A thirteenth-century Drawing of the Anatomy of the Uterus and Adnexa. *Trans. Roy. Soc. Med., Historical Section*, 1916.

Thirteenth-century Miniature illustrating Medical Practice. *Trans. Roy. Soc. Med., Historical Section*, 1916.

A Mediaeval Diagram of the Male Genitalia from MS. Bodley 399. *Trans. Roy. Soc. Med., Historical Section*, 1916.

Dr. William Gilbert, Physician to Queen Elizabeth, Discoverer of Terrestrial Magnetism and Improver of the Mariner's Compass.
Journ. Naval Medical Service, 1916.

The Early Treatment of Gunshot wounds. *Q. Rev.*, Oct. 1916.

The Legend of Salerno.
Bull. Johns Hopkins Hospital, Baltimore, January, 1917.

A Medical Compendium of the Early Part of the Twelfth Century (MS. St. John's College, Oxford, 17, circa 1110).
Chicago Soc. Med. Hist., January, 1917.

The Scientific Position of Hieronymo Fracastoro (1483–1553). (With Dorothea Waley Singer.)
Annals Med. Hist., New York and Philadelphia, 1917.

The Bristol Guy de Chauliac MS. (1420–1435).
Trans. Roy. Soc. Med., Historical Section, 1917.

A Review of the Medical Literature of the Dark Ages with a new Text of about 1110.
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Byrhtferth's Diagram of the Physical and Physiological Fours. (With Dorothea Waley Singer.)
Bodleian Quarterly Record, Oxford, 1917.

Studies in the History and Method of Science, Vol. i. Oxford, 1917.
(1) The Scientific Views and Visions of Saint Hildegard (1098–1180).
(2) A Study in Early Renaissance Anatomy, with a new text: The ANOTHOMIA of Hieronymo Manfredi, transcribed and translated by A. Mildred Westland.
Studies in the History and Method of Science, vol. i, Clarendon Press, Oxford, 1917.

An Anglo-Saxon Charm derived from the Liturgy of St. John Chrysostom. *Annals Med. Hist.*, New York and Philadelphia, 1917.

A Greek Rule for determining the Period of Life and Death. From a MS. on Mt. Athos. *Annals Med. Hist.*, New York, 1918.

A Greek text for Prognostication from the Blood.
Annals Med. Hist., New York, 1918.

The History of Science. *History*, January, 1919.

Roger Bacon. *Nature*, March, 1919.

The Manus Meditationis. *Johns Hopkins Hospital Bulletin*, June, 1919.

Anthropology and our Older Histories. *Man*, September, 1919.

A Miniature of an Operation by Cosmas and Damian attributed to Mantagna. (With Dorothea Waley Singer.)
Osler Presentation Volume, 1919.

Early English Magic and Medicine.
Paper to British Academy, January 28th, 1920. Oxford, 1920.

Greek Science and Modern Science. A Comparison and a Contrast.
London University Press, 1920.

A New Anglo-Saxon Medical Text.
Annals Med. Hist., New York, 1921.

Studies in the History and Method of Science, Vol. ii. Oxford, 1921.
(1) Preface.
(2) Greek Biology and its Relation to the Rise of Modern Biology.
(3) Steps leading to the Invention of the First Optical Apparatus.
Studies in the History and Method of Science, vol. ii, Oxford, 1921.

Science.
In J. F. C. Hearnshaw's *Mediaeval Contributions to Modern Civilization*, London, 1921.

'Greek Biology before and after Aristotle' and 'Greek Medicine'.
In R. W. Livingstone's *The Legacy of Greece*, Oxford, 1921.

The Discovery of the Circulation of the Blood. London, 1922.

Sur un manuscrit attribué à Guy de Chauliac.
Comptes Rendus du deuxième congrès international d'Histoire de la Médecine, Paris, Juillet 1921, Evreux, 1922.

Introduction to I. B. Hart's *Makers of Science*. 8vo, London, 1923.

'The Dark Ages and the Dawn' and 'Greek Medicine'.
In F. S. Marvin's *Science and Civilization*, Humphrey Milford, 1923.

Science. In Cyril D. Bailey's *The Legacy of Rome*, Oxford, 1923.

Ashcroft, F. N. s. of the late F. Fleischmann (p. 242).

Chabazite and associated minerals from County Antrim.
Miner. Mag. 1916.

The Natrolite occurrence near Kinbane (White Head), County Antrim. 1916.

Hurst, Dr. A. F. s. of W. M. Hertz. Physician, Guy's Hospital. Croonian Lecturer, 1920. Lecturer in Materia Medica and Pharmacology, Oxford. Officer in charge Seale Hayne Military Hospital, Newton Abbot, also of the New Lodge Clinic, Windsor Forest.

Editor of *Seale Hayne Neurological Studies*.

Editor of *Guy's Hospital Reports*.

Digestive Diseases. In *Pract. Encyclop. of Med. Treatment*, 1915.

Medical Diseases of the War, 1917. 2nd edit., 1918.

Constipation. 2nd edit., London, 1919.

On 'the Psychology of the special senses and their functional disorders': The Croonian lecture, delivered June 1920.
London, 1920.

Nervous and Abdominal Diseases.
In Langmead and Holmes' *Dictionary of Pract. Med.*, 1921.

Diseases of the Digestive System.
In Price's *Text-book of Medicine*, 1922.

Johnson, G. M. † Surgeon on H.M.S. *Defence* 1916 (see p. 434). London Hospital; H.S., Radcliffe Infirmary, 1908; G.P., Newfoundland; with senior Officer of Public Health, Ipswich, preparing for D.Ph.

Ryder, C. F. Judge, Port Sudan, 1916.

Vickers, V. C. Formerly a Director of the Bank of England.

Whitnall, S. E. (p. 243). M.D. 1918. Prof. of Human Anatomy, McGill University, 1919; entertained at a farewell dinner in Queen's College, 23 June 1919, Sir W. Osler in the chair. Awarded Nettleship Prize of Ophthalmological Society, 1924.

The Relations of the Lacrimal Fossa to the Ethmoidal Cells. *Ophthalmic Review*, 1911.

The Naso-lacrimal Canal: the extent to which it is formed by the Maxilla and the Influence of this upon its Calibre. *Ophthalmoscope*, 1912.

The Shape of the Orbit: its Influence upon the Eyeball (Shilling's Theory). *Ophthalmic Review*, 1913.

The Relation of the Naso-lacrimal Canal to the Maxillary Antrum. Formation of the Lacrimal Recess. *Ophthalmic Review*, 1913.

The Ligamentum Palpebrarum Mediale: Why its Removal in Ablation of the Lacrimal Sac does not necessarily entail Ectropia of the Lower Eyelid. *Ophthalmic Review*, 1913.

The Levator Palpebrae Superioris: the Attachment and Relation of its Aponeurosis. 1914.

The Human Orbit and accessory Organs of Vision. 8vo, *Oxford Medical Publications*, 1921.

Some Instances of Abnormal Ocular Muscles. *Anatomical Record*, 1921.

Some descriptive errors in the Anatomy of the Orbit. Address to International Ophthalmological Congress, Washington, 1922.

The Study of Anatomy. 8vo, Montreal, 1922.

On the stabilisation of the Vertebral Column and the claims of Chiropractic. *Reports of Select Committee of House of Legislative Assembly, Victoria, British Columbia*, Dec. 1922; also Evidence before *House of Legislature, Edmonton, Alberta*, Feb. 1923.

Live Anatomy.

"No movement in modern British medicine is more welcome than that led by some of our younger anatomists, who have caught the

spirit of Sir Charles Bell and returned to the teaching of living functional anatomy. A member of this group is Dr. S. E. Whitnall, who until he was called from Oxford to succeed Sir Auckland Geddes in the chair of anatomy at McGill University was known to his British colleagues for his researches into the anatomy of the eye and orbit, and more especially for his gift of covering a great seriousness of purpose by a happy sense of wit and humour. At Oxford he was inspired with the learned humanity which animated one of his teachers—Sir William Osler—and this spirit he has carried back to Sir William's Dominion, and allowed it to bubble freely over into a little book which he has entitled *The Study of Anatomy*, intending it for his own students. It deserves a much wider circle; we hope it may spread into every medical school where the English tongue is spoken, for it contains happily expressed precepts which young and old will find helpful and stimulating. . . .

The tradition which has clung to our British chairs of anatomy—that their occupants should be men of wide interests—finds a true representative in Professor Whitnall. In this booklet he places at his pupils' disposal a rich experience gleaned from a close study of how men should order their careers if they would take the best out of life."

'Live Anatomy' in *British Medical Journal*, 29 Sept. 1923.

Revision of section on Nerves.

Cunningham's Textbook of Anatomy, 5th edit., 1923.

1898.

Hilton, H. *m.* Edith, da. of Rev. J. Skinner Jones.

Mathematical Crystallography. 1903.

Theory of Finite Groups. 1908.

Homogeneous Linear Substitutions. 8vo, Oxford, 1914.

On singular solutions of Differential Equations. *Math. Gazette*, 1914.

Orthogonal substitutions. *Annals Math.* xv, pp. 195–201, 1914.

On characteristic lines on a surface. [With Miss R. E. Colomb.] *Mess. Math.* 1917.

On orthoptic and isoptic loci. [With Miss R. E. Colomb.] *Amer. Journ. Math.* 39, pp. 86–94, 1917.

On plane quartic curves with a node and a cusp. *Mess. Math.* 46, pp. 81–8, 1916.

The use of the orthographic projection in crystallography. *Min. Mag.* 18, pp. 122–9, 1917.

On plane quartic curves with a tacnode. [With Miss D. S. Tuck.] *Mess. Math.* 47, pp. 88–96, 1917.

On changing the plane of a gnomonic or stereographic projection. *Min. Mag.* 18, pp. 244–7, 1918.

On cleavage-angle in a random section of a crystal.
Min. Mag. 18, pp. 248–51, 1918.

On n-poled Cassinoids. *Mess. Math.* 48, 184–92, 1919.

On curves of degree n with tangents of n-point contact.
Mess. Math. 49, pp. 129–34, 1920, and 50, pp. 31–40, 1920.

'Plane Algebraic Curves,' pp. xv + 388. 8vo, Oxford, 1920.

On certain types of Plane Algebraic Curve.
Rend. Circolo Mat. Palermo 24, 1920.

On d'Ocagne's locus. *Rend. Circolo Mat. Palermo* 24, 1920.

On König and Szücs's construction.
Rend. Circolo Mat. Palermo 24, 1920.

'Mineralogical Abstracts.' *Min. Mag.* 1921–3.

On vibrations of a crystalline medium.
Phil. Mag. 42, pp. 148–56, 1921.

On triangular-symmetric curves. *Mess. Math.* 50, pp. 171–6, 1921.

On plane curves of degree n with a multiple point of order $n-1$ and a conic of $2n$-point contact.
Proc. London Math. Soc. ii. 20, pp. 93–100, 1921.

On the determination of the optic axes of a crystal from extinction-angles. *Min. Mag.* 19, pp. 233–9, 1921.

A note on crystallographic notation.
Min. Mag. 19, pp. 319–22, 1922.

On plane curves of degree $2n$ with tangents having bi-n-point contact.
Proc. London Math. Soc. ii. 21, pp. 1–13, 1922.

On plane unicursal quintic curves with a triple point. [With Miss G. D. Sadd.] *Quarterly Journ. Math.* 49, pp. 220–6, 1922.

The graphical determination of the constants of a shear.
Min. Mag. 20, pp. 65–6, 1923.

A generalization of a property of an acnodal cubic curve.
Bull. Amer. Math. Soc. 29, pp. 303–8, 1923.

A property of the bitangents of a plane quartic curve.
Mess. Math. 52, pp. 156–8, 1923.

On symmetrical plane algebraic curves.
Mess. Math. 52, pp. 168–75, 1923.

On cyclic-harmonic curves. *Annals Math.* 24, pp. 209–12, 1923.

Curling, B. J. (see p. 244).

Medlicott, W. S. Land Agent.

An unknown Warbler in Oxfordshire in 1901–2.
Cf. *Zoologist*, Jan. 1916.

Neave, S. A. Naturalist to the Katanga Medical Commission, 1906–8; Expert in E. Africa to the Entomological Research Committee of the Colonial Office, 1909–14; Assist. Director, Imperial

Bureau of Entomology, 1914–; Hon. Sec. Entomological Society of London and Association of Economic Biologists.

A Subject Index to the Review of Applied Entomology. 1917.
The use of scientific and popular names in economic biology. *Ann. appl. Biol. Cambr.* v, 1919.

Spencer, W. K. (p. 245). D.Sc. 1918. F.G.S. Lyall Award, Geological Society, 1918. Chief Examiner for Science, Board of Education, 1918–.

Zur Morphologie des Central-nerven-system der Phyllopoden. *Zeitschrift f. wiss. Zoologie*, Leipzig, 1902.
On the structure and affinities of *Palaeodiscus* and *Agelacrinus*. *Proc. Royal Society*, Lond. 1904.
A Monograph of the British Palaeozoic Asterozoa. Pt. II, pp. 57–108, Pls. *II–V*, 1916; Pt. III, pp. 109–68, Pls. *VI–XIII*, 1918; Pt. IV, pp. 169–96, 1919; Pt. V, pp. 197–236, Pls. *XIV–XVII*, 1922.

Webb, A. J.

Dutton, H. H.

1899.

de la Rue, I. A. *m.* 1912 Lilian, e. da. of Hon. Fitzroy S. K. Stewart.

Galloway, J.

Girdlestone, M. A. Killed 1915 (see p. 246).

Monck, G. S. S.

Riley, P. H.

Semon, H. C. G. Passed 1st into Indian Medical Service; Assist. to Dermatologist Univ. Coll. Hosp.; Physician to Skin Dept. Gt. Northern Hosp., 1913; Pathologist and X-ray specialist, Lady Hardinge Hosp. for Indian Troops, Brockenhurst; do. at 25th General Hospital B.E.F., 'the largest skin hospital in the world'.

The V. D. Clinical Manual. (Part author of.)
X-Ray treatment of Acne Vulgaris. *B. M. J.* 1920.
Arsenical Cancer. *B. M. J.* 1922.
Dermatitis from dyed Fur. 1923.
Some Cutaneous Manifestations of Dental Sepsis. *Lancet*, 1922.
Tinea Ungulum. *Brit. J. Dermat. and Syph.*, 1922.

Simonds, J. H.

Stewart, D. M. I.C.S. 1902, Bengal. Asst. Magistrate U.P. 1903; Under-Secretary to Govt. 1907; Dep. Commissioner 1914–18; Magistrate and Collector 1919.

Sturrock, W. D. D.S.O. King's Coll. Hosp. Med. Officer Radley College. *m.* 1909 Mary L., da. of Ivor Macpherson.

Walker, B. J. (see pp. 247, 477).

1900.

Clowes, G. C. K.

Knight, J. G. D.

Wallin, C. E.

The Operation of Kopper's by-product Coke Oven plant.
J. Soc. Chem. Industry, Sept. 1922.

Newbold, W.

1901.

Douglas, C. G. (p. 248). F.R.S. 1922.

The absorption and dissociation of carbon dioxide by human blood. [With J. Christiansen and J. S. Haldane.]
Journ. Physiol. xlviii, 1914.

The Respiratory Exchange of Man during and after muscular exercise. [With J. M. H. Campbell and F. G. Hobson.]
Phil. Trans. Roy. Soc. B. 210, 1920.

Gas poisoning in warfare: the task of the Medical Service.
Journ. of the R. A. M. C. xxxv, 1920.

Anoxoemia and its effects as seen in Gas Poisoning.
Journ. of the R. A. M. C. xxxvii, 1921.

The regulation of the general circulation rate in man. [With J. S. Haldane.] *Journ. Physiol.* lvi, 1922.

Section on Gas Warfare [With T. R. Elliott and J. S. Haldane] in the Official Medical History of the War.
Diseases of the War, vol. ii, chaps. 7–18.

Human Physiology; a practical course. [With J. G. Priestley.]
[In the press.] 8vo, Oxford, 1924.

Everitt, C.

Martin, C. H. G. Killed in action 1915 (p. 249).

Daniel, W. R. †.

de la Rue, S. A.

Fisher, K. Worked with Dr. Luther at Leipzig 1903; at Jena 1905; Chemist to Liverpool Institute of Research in Tropics; W. Africa 1905; Senior Demy 1906. Head Master, Oundle School, 1922–.

Potter, Dr. L. F.

Meade-Waldo, G. † 1916 (p. 250).

Flower, C. H.

1902.

Stewart, R. H. R. Land Agent.

Ackers, C. P.

Aldridge, F. J. St. Thomas's Hosp. Late M.O.H. Glastonbury.

Bethel, Hon. R.

Carlisle, K. M.

Gardner, T. E. O.B.E. Lecturer on Organic Chemistry, Univ. Liverpool, 1908; managing partner of Calder Vale Munition Works, Thornes, Wakefield, for manufacture of P.S. (Chloro picrin), 1916; Managing Director of West Riding Chemical Co. Ltd., Mirfield; Chartered Accountant (partner in firm of Gardner and Beauland), Bradford.

Osborne, C. G.

Stancomb, J. †.

Dinham, C. H. F.G.S.

1903.

Morrell, J. H. Assistant to Wykeham Prof. of Physics, 1920–.

Electric Oscillations in Straight Wires and Solenoids. [With J. S. Townsend.] *Phil. Mag.*, Aug. 1921.

Short Electric Waves obtained by Valves. [With E. W. B. Gill.] *Phil. Mag.*, July 1922.

Petition against Election of Frank Gray, M.P. *Oxford Times*, Feb. 1924.

Stobart, J. D.

Fry, H. J. B. M.D. 1914. D.P.H. 1920. St. Thomas's Pathol. Dept.

A German Bullet Embolus. *Lancet*, 1920.

Use of Immuned Blood Donors in Treatment of Pyogenic Infections of whole Blood Transfusion. *B. M. J.* 1920.

Nalder, H. G.

Beevor, C. F. F.R.S.Med. Asst. Ear, Nose, and Throat Dept. Univ. Coll. Hospital; Aurist to Ministry of Pensions.

Birchall, E. V. D. D.S.O. Died of wounds 1916 (see p. 467).

Dutton, F. B. M.B., B.Ch. 1917.

Hubbard, Hon. R. E.

Willett, H. W. M. s. of William Willett, the advocate of 'Summer Time'. † 1917.

Pratt-Barlow, R. F.

1904.

Stokes, E. (p. 253). Member of Imperial Education Service, India; Inspector of Schools, Rohilkhand Div., Bareilly, U.P.

A reformed Method of teaching English.
The Indian Schools Book of Verse. 8vo, Bombay, 1917.
Readers for Indian Schools.

Tizard, H. T. A.F.C. (see pp. 253, 474). Reader in Thermodynamics, 1920. Assist. Sec. Dept. of Scientific and Industrial Research.

Fuel Economy in Flight. 12th Wilbur Wright Memorial Lecture of R. Aeron. Soc. delivered to the R. Society of Arts. May 1924.

Glover, H. M. Indian Forest Service. Extract from letter:

'I am in charge of forests which stretch over an enormous extent of country, and for the last eighteen months have been extracting timber for the Indian Munitions Board in addition to my ordinary work. . . . I hope to get leave next Spring, which will be my first long leave since I joined the Forest Service. I have been lucky enough to hold a Division almost entirely concerned with coniferous woods for which the demand has increased enormously in the last few years, and which closely resemble the Continental forests, except that the trees are of much greater size and the woods are so extensive.'

Kotgarh, Simla District. 29 March 1919.

The Patriata Ropeway. *Indian Forester*, Oct. 1913.
Departmental Firing in Chir (*Pinus longifolia*) Forests in the Rawalpindi Division, Punjab. *Indian Forester*, Dec. 1913, June 1914.
Fifty years of Forest Administration in Bashahr.
Part I, from 1864 to 1892. *Indian Forester*, Nov. 1915.
Part II. „ March 1916.
Conversion of Blue Pine Forest to Deodar in the Bashahr Division of the Punjab. *Indian Forester*, Jan. 1919.
An Article on Lumbering *in Preparation*.

Walling, E. M.C. Killed April 1918 (see pp. 436, 467).

Downs, G. E. St. Thomas's Hospital, 1908. M.D. of Palmers, Gt. Marlow, Bucks.

Clarence, G. C.

Carr-Saunders, A. M. Demonstrator in Comparative Anatomy, 1921. Professor of Social Science at Liverpool, 1923–.

The Population Problem. 8vo, Oxford, 1922.
Possible Effects of Germinal Changes upon the Rise and Fall of Civilizations. *Eugenics Review*, 1922.
Absence of Pre-natal Effects of Ante-bodies in Rabbits. *Journ. Expt. Biol.* i, Jan. 1924.

Garton, C. L.

1905.

Laws, E. G.

Priest, C. R. Died of wounds, 1916 (see p. 467).

Lloyd, S. P. L.

Odling, M. Chemical and Technical Adviser to the Tees Furnace Co. Ltd., Middlesbrough, 1917.

Sparrow, W. G. K.

Robertson, M. D.

Robinson, R. L. Forestry Commissioner. O.B.E. 1916.

Moulton, J. C. Director of the Singapore Museum, June 1916. *m.* Beryl L., da. of Robert L. Greene, issue a *s.* John Geoffrey *b.* 1 Aug. 1916 (named after Geoffrey Meade-Waldo).

A swarm of butterflies in Sarawak. *Entomologist*, xlviii, 1915.
A note on collecting in the Himalayas; where the east and west meet. *Entomologist*, xlviii, 1915.
A new Cicindelid from Borneo. *Entom. Mag.* li, 1915.
New species of Cicadidae from Sumatra. *Entomologist*, l, 1917.
Cicadidae collected in Korinchi, W. Sumatra. *J. Fed. Malay States Mus.* viii, 1919.

Cox, C. E. C. (p. 475).

Osmaston, A. E.

Fenwick, C. B. Articles on *Canada* in the *World's Work* and *London Mag.*

Rice, G. V. A.C.A. with Secretaryship to Kent Portland Cement Co., Ltd. *m.* 1915 Christine, da. of Capt. F. S. Turner, J.P.

1906.

Hammick, D. L. Asst. Master at Winchester, 1919; Fellow of Oriel College, 1921; Demonstrator in Chemistry, 1921.

The oxy-ammonia flame. *Chemical News*, 1916.
The Actions of Sulphur dioxide on Metal oxides. *J. C. S.* 379–89, 1917.
Atomic and Molecular Theory. 8vo, Winchester, 1919.
Latent Heat and Surface Energy. *Phil. Mag.* 1919 and 1920.
Disodium hydrogen phosphate dodecahydrate. [With H. K. Goadby and H. Booth.] *J. Chem. Soc.* 1920.
On Surface Energy, Latent Heat and compressibility. *Phil. Mag.* 1921.
Introduction to Organic Chemistry. 8vo, London, 1921.
The Dimorphism of potassium ethyl sulphate. [With J. M. Mullaly.] *J. C. S.* 1921.
Rate of reaction of Picric acid with Nitrating acid. *J. Soc. Chem. Ind.* 1921.
Preparation of sodium and potassium phthalimide. [With G. H. Locket.] *J. C. S.* 1922.
Preparation of α-trioxymethylene and a new polymeride of Formaldehyde. [With A. R. Boeree.] *J. C. S.* 1922.
The Conversion of Para-formaldehyde into Glycollic acid. *J. C. S.* 1923.
On ω-Trichloro- and ω-Tribromo-quinaldine and the preparation of Quinaldic acid. *J. C. S.* 1923.

Venables, J. F. Asst. Physician, New Lodge Clinic, Windsor Forest. Sen. Clinical Asst. Neurological Dept. Guy's Hospital.

Stammering. *Seale Hayne Neurological Studies*, 1915.
The influence of emotion on the gastric functions. [With T. I. Bennett.] *B. M. J.* 1921.
Report of 100 cases investigated by the duodenal tube. [With F. A. Knott.] *Guy's Hosp. Reports*, 1924.

Greene, B. S. C. Civil Service.

Ogilvie, A. G. B.Sc. 1915. *m.* 1919 Evelyn D., da. of Rev. G. E. Willes; Reader in Geography, Manchester University, 1919–20; on staff of American Geographical Society. Reader in Geography, Edinburgh Univ. 1923.

Cartographic Needs of Physical Geography. *Geogr. Journ.* vol. 45, pp. 46–68, Jan. 1915.
Notes on the Geography of Imbros. *Geogr. Journ.* vol. 48, pp. 130–45, Aug. 1916.

A contribution to the Geography of Macedonia.
Geogr. Journ. vol. 55, pp. 1–34, Jan. 1920.

Physiography and Settlements in Southern Macedonia.
Geogr. Review (New York), vol. 11, pp. 172–96, April 1921.

Some Aspects of Boundary Settlement at the Peace Conference.
A pamphlet, 32 pp., in *Helps for Students of History* series.
Pub. S.P.C.K. 1922.

Geography of the Central Andes; a handbook to accompany the La Paz Sheet of the Map of Hispanic America on the millionth scale. 8vo, 240 pp., *Amer. Geographical Society*, New York, 1922.

Argentine Physiographical Studies: a Review.
Geogr. Review (New York), vol. 13, pp. 112–21, Jan. 1923.

The Physiography of the Moray Firth Coast.
Trans. Roy. Soc. Edinb., vol. 53, Part 2 (No. 19), pp. 377–404, 1923.

Cardwell, R. M. (p. 478).

Parry-Jones, O. G. Died of wounds 1916 (pp. 439, 467).

1907.

Somervell, D. B.

Coventry, A. F. Director of Bute Natural History Museum, Rothesay, 1912. Professor of Biology, Trinity Coll., Toronto.

Note on the effect of hydrochloric acid, acetic acid, and sodium hydrate on the Variability of the Tadpole of the Toad.
8vo, Leipzig, 1910.

Wilkie, A. H.

Strutt, G. S.-J.

Barnes, H. D.

Ray, W. Of Glen Osmond, Adelaide, S. Australia.

1908.

Harper, A. G. M.A., B.Sc. 1917. Professor of Botany at Madras, 1914. Killed in action 1 June 1917 (p. 440).

Noblesse oblige.
A letter signed 'A Volunteer' to the *Morning Post*, 23 July 1915.

The Storied Present. *Oxf. Magazine*, 23 Nov. 1917.

Tätige Skepsis. *Oxf. Magazine.*

Obituary notice in *Oxford Magazine.*

Winmill, T. F.

Clemes, A. W. Worked in Copper Mining Camps, Arizona, 1911–14.

Garton, A. S. Pres. J.C.R. 1910–11. *m.* 1917 Mona, e. da. of A. N. Macaulay.

Cudmore, M. M. Killed in action 1916 (p. 468).

Angas, R. F.

1909.

Acland, L. H. D.

Ritchie, A. T. A. *m.* 1917 Queenie, da. of Falconer Macdonald. Native Commissioner, British East Africa. Game Warden, Kenya Colony, 1923.

It is an age since I have had news of Oxford. I read periodically of Magdalen's triumphs, but it all seems rather remote when one gets it out of the *Weekly Times*.

My wife and I have been out here some ten months now and are charmed with the country and its fauna: less so with its white population. There are plenty of nice folk but an even larger number of real wrong 'uns. . . .

I have been employed by a land company, in looking at and reporting on land, finding boundaries, &c. It is a most interesting job and we have spent most of the time going round and camping from place to place. I have incidentally had some splendid shooting and got among the larger game, an Elephant, 2 Rhino, 3 Lions, a Leopard, 2 Eland, and a host of smaller things, all in the course of my work. I am going off on a month's leave in a few days for a real shooting trip and hope to get some good sport.

This job ends on April 1st, and I have put in an application for work in the Game Warden's Department. . . . This country is very rich in bird life, but so far I have had little opportunity of doing any photo work among either birds or beasts.

I have two delightful lion cubs, both male, which I caught a couple of months ago. Their father, I believe, is a black maned lion (most are red maned round here) and it seems probable they will be like him.

It occurred to me that the College might like to have one. If so I will try to get it home in the course of a few months and shall be delighted to give them one. It would be rather nice in a corner of the deer park. However, I don't think I can see the . . . in the guise of a lion tamer. If by any chance the College want it, will you just cable me the word 'Lion'. Address, Ritchie, Gilgil.

If you ever want any specimens of flora or fauna I shall be delighted to send them, so let me know.

Yours ever,

Safari House, Gilgil, Kenya Colony, ARCHIE RITCHIE.

Jan. 15, 1922.

Walker, F. C. Killed in action 1917.

Ball, P. Sudan C.S. At El Geteina, White Nile Province, 1917.

Vernon, W. N. *m.* 1921 Janet, da. of David Robertson-Macdonald. Director of Messrs. W. Vernon and Sons, Ltd.

Cavenagh, J. B. M.C., F.R.S.Med. St. Thomas's Hospital. Aural Specialist to Worcester Hospitals, &c. Of Thorneloe House, Worcester and 31 Harley St.

Haemangioma of Larynx. *Lancet*, 1922.

Hassard, W. A. National Motor Volunteer during the War. † 21 April 1919 at Ryde.

Symon, O. S.

1910.

Evans, G. I. M.B., B.Ch. 1917. F.R.C.S. 1921. Brackenbury Prize Med. 1916. Late Ho. Surgeon St. George's Hospital. *m.* Dilys, da. of Wm. Eames. Hon. Surg. N. Wales Blind Soc. 36 Castle Sq., Carnarvon.

Sunderland, J. Master at Boxgrove School near Guildford.

Goldsworthy, L. J. B.Sc. 1916. Assistant Director of Public Instruction and Inspector of European Schools and Science, C.P., India.

George, H. S. Indian Forest Officer, Gondwana Hills, Dec. 1915.

Paterson, J. C. *m.* 1917 Lily, da. of Sir J. Paton, M.P.

Smyth, G. M. *m.* 1917 Helen M., da. of J. J. C. Jones, C.B. General Produce Broker in Liverpool.

1911.

Chapman, E. F. Worked in the Chemical Laboratory, Tübingen, in Summer 1913. Returned in 1919 to read Physiology. M.B. 1923.

Bennett, G. Killed in Dublin, Nov. 1920.

Balfour, I. B. Killed in action Aug. 1915.

Hyde-Thomson, C. H. Wellington College, Berks.

Hodgkinson, N. A. B.A. 1917.

Horsfall, E. D. Pres. O.U.B.C. 1919. *m.* 12 June 1923 Miss Myra D. Fullerton.

Rowing. [An article penned with a view to the reconstruction of rowing at Oxford.] *Oxford Magazine*, 28 Feb. 1919.

1912.

Browne, W. L. F. Asst. Master Winchester College, 1921. *m.* 1918 Edith K., da. of David T. Whale.

Prevett, R. A. C. Military Administrator in Kurdistan, 1923.

Vernon, H. D. Killed in action Sept. 15, 1916, in the Guards' charge on the first day that tanks were used.

Bird, A. H. At the outbreak of war in 1914 was working with F. W. Halsey in a Munich Laboratory.

Carr, J. L. *m.* 1919 Constance R., da. of Sam. Smith. B.A. 1916.

Britten-Jones, E.

1913.

Halsey, F. W. Killed in action 15 Nov. 1915.

Rubie, H. E. M.A. 1919, B.Sc. 1920. Chemist at a Mineral Water Factory at Hastings 1924.

Parnell, J. A. P. Killed in action 9 Sept. 1916.

Long, W. H. T.

Berners, G. H.

Smith, L. L. de B. Killed 3 Sept. 1916.

Upton, Hon. H. A. G. M. H. *m.* 1916 Alleyne, da. of H. Conran.

von Mendelssohn-Bartholdy, H.

Madigan, C. T. I Geol. 1919. Asst. Geologist, Sudan Govt.

1914.

Gainsborough, R. M.R.C.S., L.R.C.P.

Hodgson, F. H. Killed 19 Nov. 1918.

Parsons, E. K. Killed in action Sept. 1916.

Furniss, A. E. Solicitor.

Hopkins, H. O. B.A. 1921. Middlesex Hospital.

Harvey, R. A. I Geology 1920.

1915.

Lewthwaite, R. II Physiology 1922. Middlesex Hospital.

Windram, R. W. B.A. 1919.

Read, W. D. B. I Physiology 1922.

Engleheart, F. H. A. Grandson of J. G. D. E. (p. 84). III Geology 1921. F.G.S. 1921.

Researching on the stratigraphical distribution of the Forest Marble and its relation to underlying and overlying beds, since Lent 1922.

Shaw, W. R. C. B.A. 1919.

Fraser, H. D. F.

1916–1923.

Register of Names of Members of Magdalen College who have attended Courses of Scientific Instruction since 1916. (*Continued from page* 263.)

𝔇. = Demy; 𝔎.𝔖. = Rhodes Scholar; 𝔈𝔵. = Exhibitioner.

1916 (Lent).

Ellison, Cuthbert Wynford. B.Sc. III Class in Physiology, London, 1913; IV Chem. 1917; B.A. 1919.

1916 (Michaelmas).

Dimitrijevitch, Djurdje Gavrilo. *b.* 29 Oct. 1896. Kraguyevatz Gymnasium. Diploma of Soc. Apothecaries, 1924. St. Mary's Hospital.

1917 (Lent).

Porritt, William Henry. *b.* 9 Jan. 1899. 𝔈𝔵. Wyggeston School, Leicester. Coxed O.U. VIII, 1919–22; II Chem. 1922. Science Master, Radley, 1922–3; Wrekin College 1923–.

Thesis on The condensation of ethylene dibromide with anthranilic acid.

Boulter, Stanley. *b.* 18 Feb. 1899. 𝔈𝔵. Wyggeston School, Leicester. B.A. 1921. Science Master, King William College, 1921–.

[**Mallam, Patrick Corbet.** s. of Dr. Ernest Mallam (p. 231). Prelim. Physics during Easter Vac. II Physiol. 1922. Capt. O.U.B.C. 1923.]

De Beer, Gavin Rylands. 𝔇. Harrow. Returned 1919; I Zoology 1921; President Junior Scientific Club, 1921; Christopher Welch Scholar, 1921; Demonstrator in Comparative Anatomy,

1922; Rolleston Memorial Prize, 1922; Naples Biological Scholarship, 1922; Chapman Memorial Prize, 1923; Fellow of Merton College, 1923.

Note sur les colonies artificielles de choanocytes.
Archives de Zoologie expérimentale et générale, 1922.

The Segmentation of the Head in Squalus acanthias.
Q. J. Micr. Sci. 1922.

Some Observations on the Hypophysis of Petromyzon and of Amia.
Q. J. Micr. Sci. 1923.

Introduction to the Study of Genetics.
School Science Rev., June and Sept. 1923.

Studies in Dedifferentiation. iv. Resorption and Differential Inhibition in Obelia and Campanularia. With J. S. Huxley.
Q. J. Micr. Sci., Oct. 1923.

The Evolution of the Pituitary. *Brit. J. Expt. Biology*, i. Jan. 1924.

On a problematical Organ in the Lamprey. *Q. J. M. S.*

Note on a hermaphrodite Trout. *Anat. Record*, Feb. 1924.

Contributions to the Study of the Development of the Head in Heterodontus. *Q. J. M. S.* Apr. 1924.

The prootic Somites of Heterodontus and of Amia.
Q. J. M. S. Apr. 1924.

Studies on the Vertebrate Head. Part i. Fish. *In preparation.*

Note on Placodes and the Ophthalmic Nerves. ,,

Tissue Culture. *School Science Rev.* 1924 ?

Growth. *In preparation.*

Robinson, Allen Vivian Godfrey. *b.* 30 July 1899. Wellington. Read History, 1919.

Baranatz, Slobodan. Obrenovitz Gymnasium. Forestry Diploma, 1919.

1918 (Michaelmas).

Hume-Rothery, William. *b.* 15 May 1899. Cheltenham and R.M.A. Woolwich, 1916. ⚭. 1921; I Chem. 1922. Working at Metallography at Imperial College, S. Kensington, 1922–.

Thesis on The effect of concentration and temperature on the variation of the form of calcium sulphate precipitates.

Davies, David Sydney. Abertillery and University of S. Wales. Theodore Williams Scholar in Pathology, 1921; M.B. 1923. Guy's Hospital.

Rogers, Alfred John. Gresham's School, Holt (?). Forestry.

Koerner, Edward Henry. *b.* Paris, 1890. Lycée Carnot and University of Paris, 1910–14. Guy's Hospital.

1919 (Lent).

Chapman, Edward Frederick. D.; returned to read Medicine; M.B. 1923. St. Bartholomew's Hospital.

Howarth, Herbert Lomax. D. *b.* 3 March 1900. Preston Grammar School. II Chem. 1922. On staff of London paper.

Thesis on Action of chlorsulphonic acid on substitution derivatives of phenyl glycine.

Warmington, John Edward. Ex. Shrewsbury. III Physiol. 1922. St. Bartholomew's Hospital.

Turney, Horace Ferguson. *b.* 5 Dec. 1899. Ex. Gresham's School, Holt. II Physiology 1921. St. Thomas's Hospital.

Hodgkinson, Noel Alexander. B.A. 1917; returned to read for the Geological Diploma.

Madigan, Cecil Thomas. R.S.; returned to read Geology; I Geol. 1919; M.A. 1922.

de Peyer, Everard Esme Vivian. Rugby. Pt. I Chem. 1921. Studying music at the Royal College.

Bathurst, Hon. Benjamin Ludlow. Eton. II Chem. 1923.

Theses on (i) Synthetical reactions with *o*-nitrophenyl acetic ester.
(ii) Attempt to synthesize a thioindigo dye analogous to Helindone Pink A. N.

Hoskyns, Henry William Whitly. Eton. Pt. I Chem. 1922.

Phelps, John Lecky. Harrow. IV Engineering Sci. 1922.

Butler, Leicester Travers. R.S. Hutchin's School, Hobart. III Engineering Science 1921.

Denning, Alfred Thompson. *b.* 23 Jan. 1899. D.; I Math. 1920; Eldon Scholar, 1921; Asst. Master Winchester College.

Read, Hugh Stanley Hely. *b.* 17 Nov. 1898. Magdalen Coll. School; B.A. 1923; Asst. Master.

[**Boobbyer, P. W.** Keble. Zoology Prelim.; M.B. 1918.]

1919 (Summer).

Shorthose, David Neaum. *b.* 5 Sept 1893. Ex.; II Physics 1920.

Nokes, Malcolm Cuthbert. Bishop's Stortford Coll. Hons. in Chem. 1921. Science Master at Malvern 1921–.

Research for B.Sc. 1923 on 'Substitution in Meta-Phenetidine Derivatives'.

Kent, Philip Chauncey. Charterhouse.

Wightman, Wilfrid Allan. D. Hackney Downs School. I Chem. 1922. Demonstrator at Leeds Univ. 1923.

Thesis on The interaction of thionyl chloride and thionyl bromide and ethyl α-methyl malate.

Drake, Robert Hamlyn Mervyn. Eton. 1921.

St. Audries, Alexander Peregrine Fuller Acland-Hood, Lord. Agriculture.

Vivian, Arthur Henry Seymour. Harrow.

James, Walter Ernest Christopher. Eton. Agriculture; Lecturer in Local Government and Land Tenure, School of Rural Economy, 1922.

Carver, John Edward Airey. Wellington. Forestry.

Rubie, H. E. Returned to research in Chemistry.

de Beer, G. R. D.; returned.

Pallemaerts, Frederick Adolphe François. D. Athen. Royale Belgique; Oxford High School. II Chem. 1922. Returned to a post in Belgium.

Thesis on The action of sodium on phenoxy acetic ester.

Topping, Cyril. D. Preston Grammar School. III Chem. 1923.

Thesis on The application of the Friedel-Crafts reaction to thiocresols

Grieveson, Charles James Webber. Math. D.; II Physics 1923.

Tucker, Bernard William. D Harrow. Spitzbergen Expedition, 1922, p. 465; I Zool. 1923; Naples Biological Scholarship, 1923–4. Demonstrator elect in Zoology, Cambridge, 1924.

Berthoud, Eric Alfred. D. Gresham's School, Holt. Pt. I Chem. 1922. In Anglo-Austrian Bank, Vienna, 1923–.

Griffith, Roland Hall. D.; I Chem. 1923. Senior D. 1923.

Thesis on Synthesis of 5,5′ dibrom—6,6′ dimethoxy—thioindigo.

D.Phil. student working on synthetical methods for production of thioindigo dyes.

Hickox, Edgar Herbert Cuthbert. St. Paul's. I Chem. 1922. Asst. Master Shrewsbury School 1923.

Synthesis of *m*-*a*-benzbispyrrole derivatives. *Trans. Chem. Soc.* 1922.

Berkeley, Robert George Wilmott. Downside. Agriculture.

Walsh, Robert Arthur. *b.* 9 July 1899. Ex. St. Paul's. II Physiol. 1922. St. Bartholomew's Hospital.

Hampshire, George Kenneth. Ex. Leeds Grammar School. I Chem. 1923.

The condensation of formyl succinic ester and sodio cyanic acetic ester: the nature of the product and some of its derivatives.

Hopkins, H. O. Returned.

Harvey, R. A. Returned; I Geol. 1921.

Walmsley, Robert Garrett. Liverpool College. Left in 6th week of Term.

Williams, Edmund Sheldon. Winchester.

Warren, Alwyne Keith. Marlborough. Pt. I Chem. 1922; B.A. 1922.

Willis, Roy Harold. *b.* 9 Sept. 1899. Ex. Oxford High School. II Math. Mods.; Asst. Master St. John's School, Leatherhead.

Lenanton, Hubert Ray. Winchester. Pt. I Chem. 1922.

Merry, Walter Joseph William. Charterhouse. s. of Dr. W. J. C. M. (p. 492).

Thornton, John Wakefield Witt Gray. Parramatta, N.S.W. King's College Hospital.

Crisp, Gordon Horatio. Clifton. III Physiol. 1923. St. Bartholomew's Hospital.

Wellesley-Wesley, Charles Michael St. Maur. Harrow. Agriculture. Master of New Coll., Magd., and Trin. Beagles, 1919–21.

De la Warr, Herbrand Edward Dundonald Brassey Sackville, Earl. Eton. Agriculture. Lord in Waiting to the King, 1924.

Tyrwhitt-Drake, Robert Hamilton. St. Andrew's, Grahamstown.

James, Francis Walter Tite. Winchester. Hons. in Physics 1921.

O'Brien, Hon. Phadrig Lucius. Eton. Agriculture.

Clapperton, George Douglas. Magdalen College School.

Gibbons, George Sperling. M.A. 1920. Agriculture.

Gunther, Reginald Julius. Eton. B.A. 1922. Agriculture.

1920 (Lent).

Lewthwaite, Raymond. Acad. Clerk; returned; II Physiol. 1922.

Read, W. D. B. Returned; I Physiol. 1922. Guy's Hospital.

Fleming, John Fisher. *b.* May 1898. R.S. Rugby School and Rhodesia. B.A. 1921.

1920 (Michaelmas).

Aldrich-Blake, Richard Frederick Nevill. Marlborough. I Botany 1923.

Bankes, Henry John Ralph. Eton.

Bowes-Lyon, Hon. M. Eton.

German, Guy Johnson. Rugby.

Henrey, Robert Selby. Eton.

Lendon, Guy Austin. *b.* 22 Jan. 1895. St. Peter's Coll., Adelaide. M.B. Adelaide.

Hunt, Thomas Cecil. D. St. Paul's. Theodore Williams Scholarship in Human Anatomy, 1922.

Pretyman, Walter Frederic. Eton. Agriculture.

Girdlestone, Peter Crawford. St. Peter's, Adelaide. Engineering.

Pakenham, Hercules Dermot Wilfrid. *b.* 29 July 1901. Wellington. Commission in 3rd Bn. Grenadier Guards 1923.

1921 (Lent).

Fotheringham, William Alexander. Cheltenham.

Clinch, Alan James. Hobart. R.S. 1921; II Eng. Sci. 1923.

Kennedy, James Hutchinson. Salisbury, S. Rhodesia. R.S. 1921; III Physiol. 1923. St. Bartholomew's Hospital.

Darlow, Thomas Shorrock. *b.* 3 Dec. 1901. Gresham's School, Holt. D 1920. Reading for English School 1922.

Schofield, Maurice. *b.* 6 Dec. 1901. D. 1920; Bradford Gr. School. Pt. I Chem. 1923.

Ross, Charles Clay. *b.* 12 Oct. 1901. Charterhouse and R.M.A. Woolwich.

Coombs, Herbert Isaac. ℜ.𝔖. Univ. of Adelaide. B.Sc. 1922; Pt. I Chem. 1923. Working at Biochemistry under Prof. Gowland Hopkins in Cambridge 1923.

Thesis on Synthesis of carboxylic acids and other derivatives of Indol.

1921 (Michaelmas).

Hey, Max Hutchinson. *b.* 11 Mar. 1904. 𝔇. 1921. Manchester Gr. School.

Edmondson, William. 𝔈x. Keighley Gr. School.

Strickland-Constable, Robert Frederick.

Fulton, John Farquhar. *b.* 1 Nov. 1900. Harvard Univ. I Physiol 1923; Christopher Welch Scholar, 1923.

The Blood of *Ascidia atra* Lesueur; with special reference to Pigmentation and Phagocytosis.
Acta Zi. i. *Contrib. Bermuda Biol. Stat.*, No. 125, 1920.

The Controlling Factors in Amphibian Metamorphosis.
Endocrinology, v, Jan. 1921

Novocaine as a Substitute for Curare.
P. Nat. Acad. Sci., vii. Apr. 1921.

The Catalytic Properties of the Respiratory Metals.
Science, liii, May 1921.

Concerning the Vitality of Actinia bermudensis: a Study in Symbiosis.
J. Expt. Zool., xxxiii, July 1921.

Studies on Neuromuscular Transmission. i. The Action of Novocaine on Muscle Nuclei. *Amer. J. Physiol*, lvii, Aug. 1921.

Animal Chlorophyll: its Relation to Haemoglobin and to other Animal Pigments. *Q. J. M. S.*, lvii, June 1922.

Trichodina pediculus and a new closely related species.
Proc. Boston Soc. N. H., xxxvii, June 1923.

Lapicque's Investigations on the Chronaxie of Excitable Tissues.
Nature, March 22, 1924.

Shepherd, Richard James. *b.* 9 July 1901. Pt. I Chem. 1923.

Spalding, Hugh Barbrook.

Kersey, Robert William Ray. 𝔈x

Ashhurst, Thomas. ℜ.𝔖. 1922.

Florey, Howard Walter. ℜ.𝔖. 1922; I Physiol. 1923.

Gunther, Albert Everard. Shrewsbury School.

Additions to Lists of Belgian and Serbian Boys admitted to Lectures during the German occupation of Belgium.

1916.

Broeckaert, André. Ghent.

1916 (Michaelmas).

Mishitch, Misdray M. Belgrade.
Matitch, Milan L. Belgrade.
Raykovich, Borivoye D. Kraguyevatz.
Kovandjitch, Branislav. Obrenovatz.
Jevremovitch, Ivan. Uzitze.
Katanitch, Alexandar. Kraguyevatz.

Register of Members of Colleges (other than Magdalen College) who have attended Mr. Manley's Course of Quantitative Chemistry in the Daubeny Laboratory during the period 1918–1923.

1918 (Michaelmas).

Horsley, S. M. (p. 291). St. John's. III Chem. 1919.
Williams, Edward Christopher. St. Benet's Hall. Pt. I Chem. 1921. At Ampleforth.
Garton, Frank Leslie. B.N.C. Pt. I Chem. 1921.
(1) Triazo and Triazole Derivatives of 2.4-Dichloraniline and Benzidine; (2) Tetrachloro-iodides of some Organic Bases; (3) Diazonium Perhalides.
Litton, Edward Falconer. New Coll. Pt. I Chem. 1920.
Mill, Charles King. C.C.C. Pt. I Chem. 1921.

1919 (Lent).

Taylor, Thomas Weston Johns. Fellow and Lecturer of B.N.C. I Chem. 1920.
Nuttall, Robert Hill. Merton. B.A. Hon. Chem. 1920.
Parkes, George David. Queen's. Pt. I Chem. 1921.
Research for B.Sc. on Derivatives of Tartaric Acid.
Clayton, Herbert. Lincoln. Hon. Chem. 1920; B.Sc. 1922.
Steel, Joseph Lincoln Spedding. St. John's. Pt. I Chem. 1921.

Warr, John Colver. St. John's. Pt. I Chem. 1921.
Gaskin, Arthur Durant. Non-Coll. II Chem. and Cryst. 1921.
Codd, L. W. (p. 291). Univ. I Chem. 1919; M.A. 1921.
McGowan, Frank. St. Edm. Hall. Hon. Chem. 1920. In Holy Orders.
Dorman, Joseph Warren. St. Benet's Hall. Pt. I Chem. 1920.
O'Reilly, James Patrick. St. John's. III Chem. 1922.
Sholl, Harry Percival Gascoigne. Worc. Hon. Chem. 1920.
Saravanamuttu, Manicasothy. St. John's.
Fletcher, Hubert Lionel. New Coll. Pt. I Chem. 1921.
Story, George Frederick Evelyn. Merton. I Chem. 1922.
Riley, George Clifford. Merton. B.Sc. 1921.
Stacey, Harold Roddis. New Coll. B.A. 1920.
Bullen, John Gilby. Merton. B.A. Hon Chem. 1920.
Brasnett, Leslie Stanley. Ch. Ch. B.A. 1921.
Cross, Frank Leslie. Balliol. Pt. I Chem. 1920.

1919 (Trinity).

Alford, Vincent. Univ. B.A. Hon. Chem. 1921.
Benson, Hon. John Roby. Balliol.
Edmonds, Henry Ronald Orlando. B.N.C. I Chem. 1922.
Atkinson, George Leslie. Ch. Ch. II Chem. 1922.
Sutcliffe, Ronald. Non-Coll.
Nuttall-Smith, Ralph Nuttall. Trinity. II Chem. 1922.
Harris, Robert Austin Meire. Ch. Ch. B.A. Hon. Chem. 1920.
Bolton, Arthur. B.N.C. B.A. Hon. Chem. 1920.
Gordon, Kenneth. M.C. St. John's. I Chem. 1921.
Cooke, Edmund Allaway. St. John's. I Chem. 1922.
McCarthy, Jeremiah Patrick. Campion Hall. Pt. I Chem. 1919.
Kent-Hughes, Wilfrid Selwyn. M.C. ℞.𝔖. Ch. Ch.
Hill, Henry Rowland. B.N.C. III Chem. 1922.

1919 (Mich.).

Quantitative Chemistry exclusively.

Hoyle, George. Queen's. II Chem. 1922.
Bell, Edward Oliver Leonard. Univ. B.A. Hon. Chem. 1922.
Masterman, Cyril Aubyn. Balliol. B.A. 1920.
Clarke, George Robin. Oriel. Hon. Chem. 1921. Research Scholar.
Hathaway, Thomas William. Non-Coll. M.A. 1920.

Macdonald, James Rowntree. Balliol. B.A. 1921.
Dowden, Henry James. Keble. II Chem. 1923.
Ireland, Stanley John. Keble. II Chem. 1923.
Havard, Robert Emlyn. Keble. I Chem. 1922.
Strouts, Charles Richard Noel. Keble. Pt. I Chem. 1922.
Deane, N. Non-Coll.
Pilley, John Gustav. Exeter. I Chem. 1922.
Dixon, Percy Embleton (p. 292). Queen's. M.M. M.A. 1922.
Gallop, M. W. St. Edm. Hall.
Howard-Flanders, William Edgar. Exeter. B.A. 1920.
Berry, Eustace Albert. Queen's. Pt. I Chem. 1921.
Drescher, Hugh Albert Edward (p. 292). Queen's. II Chem. 1921; M.A. 1921.
Richards, John Edward. Non-Coll. III Chem. 1923.
Mellmott, W. B. Univ.
Patey, Charles. B.N.C. II Chem. 1923.
Daldy, Alfred Cyril. Queen's. Pt. I Chem. 1921.
Hardy, Richard Kenneth. Queen's. II Chem. 1923.
McKenzie, Thomas Harry Fitzgerald. Keble. B.A. Hon. Chem. 1921.
Staynes, Thomas Arthur. M.C. B.N.C. II Chem. 1923.
Biggers, Wilfrid Norman. Non-Coll. Pt. I Chem. 1922.
Harrison, John Malthouse. Queen's. I Chem. 1921; M.A. 1921.
Walker, Arthur John. Queen's. I Chem. 1923.
Thompson, John de Forest. Univ.
Miller, Cyril Thomas. Trinity.
Straker, Graham Frederick. Oriel.

1920 (Lent).

Mills, Henry Compton. New Coll. II Chem. 1923.
Turner, N. Queen's.
Forbes, James Graham. New Coll. Pt. I Chem. 1922.
Snow, Oscar Walter. New Coll. I Chem. 1923.
Wilkes, Sydney Herbert. St. John's. M.C. w. two bars.
Hicks, Ernest Cranfield. St. John's. B.A. Hon. Chem. 1921.
Warburg, Frederick John. Ch. Ch.
Davis, Richard Frederick Gordon. *Ex.* Ch. Ch.
Keeble, Hugh Munro. St. John's. II Chem. 1923.
Harris, Hinton John. Queen's. M.A. 1920.
McEwen, Paul Alexander. Univ. B.A. Hon. Chem. 1921.

1920 (Trinity).

Sanford, Chris. Hertford. I Chem. 1923.
King, Lionel May. Ch. Ch. III Chem. 1922.
Edwards, George Alfred. St. John's. I Chem. 1923.
Walton, Claud Baskerville. Non-Coll.
Shepperd, Charles Bertram (p. 291). Queen's. M.A. 1921.
Demuth, William Henry Horner. New Coll. Pt. I Chem. 1922.
Watkins, Josceline Charles Shaw. B.N.C.
Gunther, Eustace Rolfe. Caius College, Cambridge. II Nat. Sci. Tripos, Pt. I, 1923. Naturalist (elect) to *Discovery*, 1924.
Mold, Clarence Edward. New Coll. II Chem. 1922, B.A.
Fletcher, William Baldwin. St. John's. I Chem. 1923.
Belcher, Bernard Charles. Queen's.
Tarling, Keith Ellis. Keble.
Currie, John Alexander. Univ. Pt. I Chem. 1922.

1920 (Mich.).

Jenkinson, Harold. New Coll. Pt. I Chem. 1923.
Martin, Reginald Ernest Semple. Keble. Pt. I Chem. 1923.
Baldwin, Charles Edwin. St. Edm. Hall. Hon. Chem. 1922.
Greenway, Ronald Charles. New Coll. Pt. I Chem. 1921.
Murray, Humphrey Desmond. S. Ch. Ch. I Chem. 1922.
Wright, Norman Charles. Ch. Ch. Hon. Chem. 1921.
Widdowson, William Peacock. S. Ch. Ch. II Chem. 1923.
Brisley, Charles William. Keble. Pt. I Chem. 1921.
Ewart, Frederick Kenneth. Exeter. Pt. I Chem. 1923.
Allen, Arthur Thamer Lockwood. Exeter. Pt. I Chem. 1923.
Bell, Gerald Spencer. New Coll. Aegrotat 1921, B.A.
Fletcher, Hubert Lionel. New Coll. Pt. I Chem. 1921, B.A.
Hamer, Philip. New Coll. II Chem. 1922.
Jeffree, John Henry. S. Univ. Pt. I Chem. 1923.
Widdowson, Benj. Cecil. B.N.C. Pt. I Chem. 1923.
Miller, Henry Frederick Roddam. B.N.C. Pt. I Chem. 1923.
Bomford, Raymond Francis. B.N.C. Pt. I Chem. 1923.
Williams, Owen Glynne. Non-Coll.
Haynes, Fred. Non-Coll. Pt. I Chem. 1922.
Turner, N. Queen's.
Hall, Richard Isaac Edward. Non-Coll. Pt. I Chem. 1923.
Watkins, J. L. B.N.C.

Friend, Howard Furneaux. B.N.C. Pt. I Chem. 1923.
Smith, Harry Frank. Univ.

1921 (Lent).

Lanyon, John Arthur. New Coll. II Chem. 1922.
Tingey, Arthur Harold. Ch. Ch. Pt. I Chem. 1922
Daniels, Charles Brian. Queen's. Pt. I Chem. 1923.
Barbour, David Neville. St. John's. M.A. 1921.
Johnstone, Kenneth Ray. Balliol. Ex.
McCorquodale, Malcolm Stewart. Ch. Ch. Pt. I Chem. 1923.
Barnes, Harold Charles. Pembroke. III Chem. 1922.
Lockett, Maynard Vernon. St. John's. R.S. Pt. I Chem. 1922.
Brown, George Thomas. Exeter.
Verschoyle, Richard Plews. New Coll. Pt. I Chem. 1923.
Booth, Henry. Univ. Pt. I Chem. 1923.
Burch, John Edward. Non-Coll.
White, Carey Martin. Non-Coll. Pt. I Chem. 1923.
Rait, Reginald Logan. Univ.
Cozens-Smith, Edward. Exeter.
Latham, Marcus. B.N.C. Pt. I Chem. 1923.
Backeberg, Otto Guido. Queen's. R.S. I Chem. 1923.

1921 (Trinity).

McInnes, Noel Airton. New Coll.
Thompson, George Stephen. Ch. Ch. Pt. I Chem. 1923.
Richardson, Edward. Keble. II Chem. 1923.
Meden, Alexander Peter. B.N.C.
Oliver, John Scott. Ch. Ch. Pt. I Chem. 1921.
Hillard, Charles Kenneth. Ch. Ch. Pt. I Chem. 1922.
Wall, Thomas John. Ch. Ch. II Chem. 1923.

1921 (Mich.).

Callow, Robert Kenneth. Ch. Ch. I Chem. 1923.
Jacks, Graham Vernon. S. Ch. Ch.
Crawford, Franz Hazlett. St. John's. R.S. I Chem. 1923.
Henwood, William Ellis. Pembroke. II Chem. 1923.
Wignall, Ernest William. B.N.C.
Coulson, Edward Auty. Queen's.
Holder, John Eric Duncan. B.N.C. Pt. I Chem. 1923.
Williamson, J. H. Pembroke.

Guy, William George. Ch. Ch. II Chem. 1923.
Collie, Carl Howard. New Coll. S.
Vassar, Harold Anthony. Exeter.
Sheppard, Charles Oliver. New Coll. Pt. I Chem. 1923.
Corfield, Frank Derek. Exeter.
Sharp, John Frederick. Univ. S.

1922 (Lent).

Proctor, Philip Kennedy. Ch. Ch.
Holt, Winston Ellis. Exeter.
Gowing, Geoffrey Senior. St. John's. Pt. I Chem. 1923.
Rowell, Sidney William. Ch. Ch.

1922 (Trinity).

Nicholls, Richard Rivers Kelynack. Keble.
Herrtage, Stanleigh Eric. St. Edm. Hall.
O'Sullivan, Cornelius Donnell. Ch. Ch.
Dilworth, Richard Henry. Keble.
Herdman, Emerson Tennent Rex. New Coll.
Shepperd, C. B. Queen's.
Murgatroyd, John Blackburn. New Coll.
Leggetter, Percival Charles. Hertford. M.C. Hon. Chem. 1922.

1922 (Mich.).

Humphrey, William Gerald. Queen's.
Merren, William John Reginald. Exeter.
Spencer, John Herbert. Queen's.
Curjel, William Ryle Clifford. Keble.
Roche, John Fenwick Adair. Wadham.
Richardson, Fred Beresford. St. John's. R.S. Pt. I Chem. 1923.
Mourant, Arthur Ernest. Exeter.

1923 (Lent).

Woodhouse, Charles Powys. B.N.C.
Todd, J. Exeter.
Beere, Lionel O'Sullivan. St. Edm. Hall.

1923 (Trinity).

Oakeshott, Stephen Hellicar. Wadham.
Perkins, John Ferrar. New Coll.
Scott, William Donald. Univ. S.

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